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WORLD PETROLEUM

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Transportation: Nearly a billion barrels of crudes and refined petroleum products are carried on the high seas every year.

By M. Rittase

NEW YORK • # WORLD • LONDON

PETROLEUM

Import Tariff Repercussive

AGITATION for an import tariff on petroleum has not ceased in some sections of the United States, although the proposal was rejected by Congress and frowned upon by a Washington administration well versed in international commerce. Efforts to impose such a tariff probably will continue until the numerous lesser producing and refining interests, whose businesses are entirely local, have been convinced that "oil protection" is protection in theory but in practice an economic absurdity. Those who follow closely the movements and trend of world-wide marketing of crudes, fuel-oils, lubricants, kerosene, waxes and gasoline, and America's part in this important trade, and who are not blindly biased by purely selfish motives, can better understand the repercussions of a duty. Most of the imports now made are by American companies who recognize that in so doing their own domestic oil producing lands are being partly conserved for future production, and that it also tends to slow up in general the reckless, uncontrolled tapping of the natural oil resources of the United States. Farsightedness has given them oil production in many lands, and, as it happens supplies from other countries can just now be obtained more cheaply than domestic oil.

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Problems of Independents

FAR FROM ALL the oil produced in the United States is consumed internally. Exports of crudes and petroleum products—plus bunkers for ships of all nations—amount to an enormous sum annually. Simultaneously with an increase of imports last year exports showed a substantial gain, and now reach about 200,000,000 bbl. per annum. Yet agitators for an oil tariff would be the first to howl at the effect of a tariff which would cripple America's overseas petroleum business. Ships would bunker where fuel was cheapest. Crudes and refined products from the Caribbean would be diverted to world markets, where they already have made a substantial entry and where they would compete with American oils. Strategically, the Caribbean is much better situated to capture international trade than is the U. S. A. If independent producers feel that they must drain their oil properties with all possible speed the solution of their problem is to be found in more efficient geological work to cut down the number of dry holes, better drilling methods and more highly developed equipment in conjunction with more efficient refining and keener sales policies, thus cutting down the cost between spudding and supplying the consumer at the roadside pump, and simultaneously increasing profits. Systematic encouragement of better roads will help to bring consumption to the level of production by increasing traffic and mileage.

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Another side of the case

UNWARRANTED FEAR is felt by smaller oil producers that a vast flood of Caribbean oil may enter the United States unchecked. There is a dumping law, which Washington is ever ready to use when justified, to prevent such a situation. Far greater is the danger of Russia's entry into the World's oil markets on a vast scale, jeopardizing America's big export business. True, the enormous potentialities of the several Venezuelan fields would make the actual supply sufficient, but the available tanker tonnage could not handle the oil. Fortunately the production of crude there is practically under the control of five great oil companies, four of which are American, and between whose executives there exists a sensible understanding and harmonious operating relations. These men can enter into written or unwritten agreements unhampered by such laws as now make regulation extremely difficult in the United States. With the markets of the world virtually in their hands if they preferred to start a price war, and with production and refining costs lower than anywhere else, and with only Russia on the horizon as a formidable competitor, these men recently have wisely halted their great expansions of the past few years, instead of playing havoc with international oil trade at a critical time. They have limited production to the capacity of existing Lake tonnage, and will not build more ships until the demand warrants additional transportation and production facilities.

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Eliminate Gas Tax Signs

FEATURING state and government gasoline taxes on the price bulletins of service stations is an unsound policy, and should be discouraged by oil companies owning or supplying the stations. Taxes which range from two to fourteen cents in various parts of the world are used for road improvements and construction, and, unless excessive, stimulate gasoline sales

by increasing and speeding up traffic. Few automobilists resent what is one of the fairest forms of taxation ever imposed, but it is unwise to drive home every time a man buys fuel that he would be paying two, four or six cents less per gallon if it were not for the tax, especially when price fluctuations from time to time vary far more than the amount of the tax. Practically everywhere the revenue from gasoline taxes goes to road building and maintenance, and wider and better roads will do more than anything else to stimulate the oil industry. Just what is gained by a price sign in big letters, and underneath in minute type the words "plus..tax" is hard to understand; in fact its tendency is to make the purchaser feel that it is a catch-penny device and make him resentful. It is far more constructive to place a sign urging better roads on every gas pump alongside an inclusive price, for the automobilist knows that he will get far greater mileage per gallon on a smooth concrete or asphalt road, and with the extension of improved highways will use the roads more frequently.

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World Oil Production · July 1930

PRODUCTION curtailment has not yet reached a satisfactory stage in the United States, there being an increase in July of 1,608,200 bbl. over June. Stocks on hand have not been sufficiently reduced to justify such a big output. Venezuela, which in June showed a slight increase over May, shows a drop of nearly 100,000 bbl. This does not seem very much until the figures are compared with the rapid expansion of the past few years, when they clearly indicate the result of the curtailment understanding recently reached between the five biggest producers. Mexico has had another increase, exceeding June by nearly 150,000 bbl. Trinidad shows a slight gain, but not enough to affect the Eastern market of the U. S. A. which now purchases much of the gasolene refined in that British colony. Persia now takes fourth place in the World, while Russia has almost caught up to Venezuela.

		JULY, 1930	JULY, 1930
United States	A. P. I.	*78,121,200 bbl.	11,160,171 tons m.
Venezuela	official	11,657,926 bbl.	*1,665,418 tons m.
Russia	official	1,594,700 bbl.	*11,162,900 tons m.
Persia	official	3,850,000 bbl.	*550,000 tons m.
Neth. E. Indies & Sarawak[1]	estimate	..... bbl.	..... tons m.
Rumania	official	..... bbl.	..... tons m.
Mexico	official	*3,436,516 bbl.	490,931 tons m.
Colombia[6]	private	*1,695,845 bbl.	..... tons m.
Peru[4]	official	*1,044,470 bbl.	149,210 tons m.
Trinidad	official	*772,319 bbl.	110,331 tons m.
Argentina	estimate	720,600 bbl.	114,371 tons m.
India—British	estimate	600,000 bbl.	84,357 tons m.
Poland	official	392,700 bbl.	*56,100 tons m.
Japan and Taiwan	estimate	170,000 bbl.	24,286 tons m.
Egypt[2]	private	152,796 bbl.	21,828 tons m.
Ecuador[5]	official	..... bbl.	..... tons m.
Sakhalin	estimate	100,000 bbl.	14,286 tons m.
Canada[3]	private	*82,542 bbl.	11,791 tons m.
Others†	estimate	165,000 bbl.	23,428 tons m.

1. Sarawak (official) 369,656 bbl. or *52,808 tons, four weeks ending Aug. 8.
2. Five weeks, June 28-Aug. 2, Anglo-Egyptian Oilfields, Ltd.
3. Imperial Oil Company.
4. International Petroleum Co. gives 826,472 bbl. "World Petroleum's" figures above are Peruvian Govt. official returns.
5. Anglo-Ecuadorian Co. reports, *16,818 tons, or 117,725 bbls.
6. International Petroleum Co.

* Measure used in official return. † Germany, Iraq, France, Italy, Czecho-Slovakia, etc.

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World Oil Production · June 1930

AUTHENTIC returns are missing from the Netherlands East Indies (although Sarawak official figures of 378,847 bbl. are to hand), Persia, Argentina, British India, and Egypt. The estimates quoted, however, will be found reasonably close. As the result of curtailment steps the most substantial drop in output is shown by the United States, where the greatest decline took place in Oklahoma, where every major producing area reported a decrease except Seminole. New Mexico showed a big increase, producing 773,000 bbl., compared with 86,000 bbl. in June a year ago.

Venezuelan production was very slightly higher than the output in the previous month, possibly due to Colon.

		JUNE, 1930	JUNE, 1930
United States	official	*76,513,000 bbl.	10,930,428 tons m.
Venezuela	official	11,648,847 bbl.	*1,664,121 tons m.
Russia	official	10,400,600 bbl.	*1,485,655 tons m.
Persia	estimate	3,850,000 bbl.	550,000 tons m.
Rumania	official	3,640,000 bbl.	*520,000 tons m.
Neth. E. Indies & Sarawak	estimate	3,500,000 bbl.	*500,000 tons m.
Mexico	official	*3,287,054 bbl.	469,579 tons m.
Colombia	private	1,695,840 bbl.	242,263 tons m.
Peru	official	*1,055,380 bbl.	150,768 tons m.
Trinidad	official	*766,067 bbl.	109,438 tons m.
Argentina	estimate	832,650 bbl.	118,950 tons m.
India—British	estimate	600,000 bbl.	84,357 tons m.
Poland	official	373,100 bbl.	*53,300 tons m.
Japan and Taiwan	estimate	170,000 bbl.	*24,286 tons m.
Egypt	estimate	144,590 bbl.	20,370 tons m.
Ecuador	official	*129,762 bbl.	18,537 tons m.
Sakhalin	estimate	110,000 bbl.	15,628 tons m.
Canada	private	*111,960 bbl.	15,851 tons m.
Others	estimate	170,000 bbl.	24,285 tons m.

* Measure used in official return.

FINANCE

New York : September

LIGHT volume and comparatively narrow price movements characterized the oil shares as well as other departments of the list during the period covered by the accompanying tabulation. Sentiment concerning the oil industry has perhaps become slightly more favorable, on account of continued successful curtailment efforts in both producing and refining departments, but any general improvement of the whole market has been impossible in the face of the fear and uncertainty as to the extent of the crop damage resulting from prolonged drought. If, as now appears possible, this damage is not too extensive the higher prices for farm products may prove stimulating to industry and business and a stronger security market could well be in evidence this fall, when at least a seasonal upturn in business would be in order, and helpful to the petroleum situation.

HALF year report of Tide Water Associated Oil Company showed consolidated net earnings equal after preferred dividend requirements to 58 cents per common share, a slight gain over the 56 cents a share earned in the corresponding period of last year. Gross sales declined about $10,000,000 to $73,-291,000, doubtless due to lower prices rather than a decline in physical volume of business; but corresponding reductions in expenses and charges resulted in slightly higher net for stockholders. Of the two major operating subsidiaries, Tide Water Oil reported a very small decline in net while Associated Oil contributed a moderate gain. Associated Oil is one of the four or five leading marketers along the West Coast and Tide Water Oil has well developed outlets in the Atlantic Seaboard territory.

PURSUING its program of expanding marketing facilities in the interior of the United States, Vacuum Oil Company is acquiring the White Star Refining Company, whose headquarters are in Detroit, Michigan. The basis of exchange of shares is 92½ shares of Vacuum for each 100 shares of White Star, which at current market levels indicates a total price for the company of somewhat more than $24,000,000. White Star Refining operates two refineries, one at Trenton, Michigan, and the other at Wood River, Illinois, and sells its products to dealers and through its own filling stations in Michigan and nearby states. Its record over the past five years has been highly creditable, net having increased from $538,000 in 1925 to $2,-950,000 in 1929. It is reported that announcement may soon be made of acquisition of another marketing company by Vacuum, viz, Wadham Oil Corpn.

MEXICAN SEABOARD OIL COMPANY reports for the six months ended June 30 consolidated net profit, including Cia Internacional de Petroleo y Oleoductos, S. A., equal after all charges to 45 cents a share on 1,244,383 no par shares. In the same period of 1929 company reported profit before depletion and excluding the Internacional Company of $14,489.

SHELL UNION OIL, important American subsidiary of the Royal Dutch-Shell interests, reported a net loss of $280,-977 for the six months ended June 30 and a deficit for the period after dividends of $10,529,844. For the same period of 1929 net before Federal taxes amounted to $9,509,659, slightly more than enough for dividend requirements.

New York Stock Prices

1930 High	1930 Low	Current Div. $ per Annum	Stock (Par Value $)	August 4–16 Sales (Shares)	First	High	Low	Last	Change[1]
51⅜	30⅛	†2.00	Atlantic Refining (25)	40,300	37	38⅜	34¾	37	— ⅜
34	20½	2.00	Barnsdall, A (25)	34,600	23⅛	24⅜	22⅛	23⅜	+ ⅜
8¼	3½	....	Colon Oil (No)	1,700	4	4¼	3⅞	4	+ ⅛
30½	18⅝	....	Continental Oil (No)	50,100	20⅝	21⅝	19¼	20¾	.....
7⅝	5½	....	Creole Petroleum (No)	7,300	6⅜	6⅜	5⅞	5⅞	— ½
166⅞	115⅛	1.50	Gulf Oil Corp. (25)	7,000	124⅞	127⅛	115⅛	122½	— 2⅛
119	78	2.00	Humble Oil & Ref. (25)	4,600	88⅝	91	85	91	+ 2⅝
30	18⅛	0.50	Imperial Oil, Ltd. (No)	9,400	20⅝	21	18⅝	19⅛	— ¼
23⅜	8¾	....	Indian Refining (10)	40,800	12⅛	13¼	10¼	11½	— ⅜
24	17⅝	1.00	International Petr. (No)	14,000	19	19⅝	17⅝	18⅛	— ¼
29½	21¼	....	Lago Oil & Transp. (No)	3,600	28¾	29	28¼	28¾	+ ⅛
37	16⅛	....	Mexican Seaboard (No)	109,200	22½	23⅞	19¼	21⅞	— ⅝
67½	50½	....	Pan Amer. P. & T., B (50)	16,300	59	59	57¾	58	— ⅝
44¾	29⅛	**2.00	Phillips Petr. (No)	56,900	32½	33¾	30½	32½	— ½
54	35	2.00	Prairie Oil & Gas (25)	4,000	37½	37½	35	35	— 2
27¼	19½	1.50	Pure Oil (25)	24,700	21½	27⅛	20¼	20⅝	— 1¼
28¼	14⅜	2.00	Richfield Oil (25)	31,000	17½	17½	15⅛	16½	— ⅝
56½	49⅛	*3.20	Royal Dutch (N. Y.) (13⅓)	15,000	51¾	52¾	50½	51	— 1
25½	15⅞	1.40	Shell Union (No)	35,200	19⅝	19⅝	15⅞	15⅞	— 3½
32	20	2.00	Sinclair Consol. (No)	119,800	24⅛	25¼	21⅝	23¾	— ½
42	28½	2.00	Skelly Oil (25)	5,500	30¼	31	28½	28¾	— ⅜
75	55½	2.50	Standard Oil of Calif. (No)	45,700	63	65½	60⅝	62⅝	— ⅛
59¾	47⅝	2.50	Standard Oil (Ind.) (25)	71,400	50⅝	50⅝	49⅝	49½	— 1⅛
40½	30⅛	1.60	Standard Oil (Ky.) (10)	7,500	32	32	31	31⅝	— ⅛
84⅞	58	†2.00	Standard Oil (N. J.) (25)	561,300	72⅛	74¾	67¼	71¾	— ⅛
40⅜	30	1.60	Standard Oil of N. Y. (25)	42,200	32½	32¾	31	31½	— ⅝
70	50	§1.00	Sun Oil (No)	2,400	59¼	60	55⅝	57⅞	— ½
60½	50¼	3.00	Texas Corp. (25)	29,600	53	53⅝	51	52⅝	— ⅛
17¾	10¾	0.60	Tide Water Assoc. (No)	28,900	13⅞	14⅝	13⅜	14½	+ ⅝
24	16¼	≥0.30	Transcontinental, new (No)	38,900	18⅛	18⅝	17⅛	17⅜	— ⅝
50	37	‡2.00	Union Oil of Calif. (25)	3,900	41	41	40	40¼	— ¾
97¾	76¼	†4.25	Vacuum Oil (25)	11,900	85⅝	85½	80½	82	— 3½
4½	2	....	Venezuelan Petr. (5)	1,100	2½	2⅝	2⅜	2⅜	— ⅛

[1] Since close of last month's table. *Paid last year—no regular rate. **Plus 5% in stock.
† Including extras. ‡ Plus 4% in stock. § Plus 9% in stock. ≥ Initial dividend.

STOCKHOLDERS of both Ohio Oil and Transcontinental Oil have ratified acquisition of the latter by the former, and Transcontinental has voted to dissolve the corporation. Two new shares of Ohio oil will be issued for each old share, and payment for Transcontinental in the new shares will be at the rate of 4/7ths of a share for each present Transcontinental share outstanding. Ohio Oil has declared a quarterly dividend of 50 cents a share on the new stock, payable September 15. Transcontinental stockholders will be entitled to this dividend.

Net profit for the second quarter of this year of $2,874,031 was a substantial recovery from the loss of more than $3,-000,000 sustained in the first quarter, but even so was only a little more than half of the quarter's dividend disbursements. In order to conserve cash resources for continuing company's expansion, directors decided to omit the

quarterly common dividend of 35 cents a share which would have been due about September 30. Since the Royal Dutch-Shell group owns approximately 72 per cent, or more than 9,400,000 shares of the 13,068,497 common shares outstanding the dividend omission means loss of cash income of this group of more than $3,290,000 quarterly, or about $13,175,000 annually. The management is continuing its conservative accounting practise with regard to charges against income for depreciation, depletion, etc., and could undoubtedly otherwise report more favorable earnings if it so desired. For the half year just reported these charges constituted 89 per cent of total profits before charge-offs, while at the close of last year accumulated reserves amounted to $175,512,000, leaving net property account at $332,178,000.

The company's recent expansion has placed operations practically on a national scale, and the heavy expense incident thereto in addition to the lower prices prevailing has without doubt largely contributed to the comparatively poor showing of the year to date.

MERGER of Lago Oil & Transport with Pan American Petroleum & Transport, referred to in these columns last month, has been approved by Lago shareholders. Each Lago share will be exchanged for one-half share of Pan American class B common.

SINCLAIR CONSOLIDATED OIL will retire on September 2 all the outstanding balance of its 3-year 6 per cent first lien collateral trust notes which were originally issued in the amount of $20,000,000 on September 1, 1927. Payment of the $15,400,000 now outstanding will be made from current funds, and will leave total funded debt of the company equal to $67,655,000. Net profits for the first six months of 1930 were $3,251,709.

Special stockholders' meeting has been called for September 17 for approval of two proposals of major importance in the future plans of the company. Approval is sought of sale of half interests in Sinclair Crude Oil Purchasing Company and Sinclair Pipe Line Company to Standard Oil Company (Indiana), (present owner of the other half interests) for the sum of $72,500,000. In the company's letter to stockholders it is pointed out that Sinclair's investment in these two companies represents an outlay of $44,188,000 so that the sale price yields a substantial profit. It is further stated that the transaction is necessary to the carrying out of expansion plans in accordance with the independent development of the organization. It is generally understood that these plans involve merger with Prairie Oil & Gas and Prairie Pipe Line, with the possibility that Tide Water Associated may later be brought into the consolidation.

The other proposal is to amend the charter to prohibit further issuance of the 8 per cent $100 par preferred stock of which 141,294 shares are now outstanding, and to provide authorization for issuance of a new preferred of no par value, which may be issued in series as required and with such provisions as to dividend rate, voting power, sinking fund, convertibility, callable feature, offering price, etc., as the board of directors may consider desirable at the time. No immediate issuance of preferred stock is contemplated, but the authorization is desired so that the management may be provided with a ready means of meeting future capital requirements as they may arise.

ATLANTIC REFINING COMPANY and subsidiaries show net profits for the first six months of 1930 of $2,818,823, or equivalent to $1.05 per share on the common. This compares with $8,862,409 for the same period last year.

C. C. BAILEY.

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American Oil Well and Refinery Machinery Exports

ALTHOUGH world-wide curtailments of oil production are more or less in force many companies are bringing their drilling equipment up-to-date, and new refineries are being erected in various countries. Consequently it is not surprising that exports of American oil well and refinery machinery and equipment for the first six months of 1930 have made a new record, and have exceeded the first six months of last year by nearly three million dollars, as briefly announced in the August WORLD PETROLEUM.

According to the U. S. Department of Commerce the total sales to other countries from January to June, 1930, amounted to $15,833,838 compared with $12,883,383 for the same period in 1929—a gain of $2,950,455. Total sales for 1929 amounted to about $25,000,000.

Evidently the increase was maintained, as exports for June of this year were $458,512 higher than June, 1929. Exports were divided as follows:

Oil and Gas Well Drilling Machinery	Oil Refinery Machinery	Other Well Drilling Apparatus
$5,342,409	$9,751,198	$740,231

This machinery was shipped to 52 of the countries covered by the circulation of WORLD PETROLEUM. Detailed figures for May, 1930, are available. The largest purchaser of drilling equipment for that month was Russia with $254,307. Argentina was the next best customer with $123,311, followed by Venezuela who spent $99,079 in the U. S. A. in May. Rumania was very close with $93,901; then followed Colombia, Canada, British India, Persia, Netherlands East Indies, Trinidad and Morocco in the order named.

Of refinery machinery exported in May the Netherlands East Indies, including Java and Madura, headed the list with $341,434. Russia was second with $190,191; British India was third, Rumania fourth and Venezuela fifth.

Actually the total oil field and refinery supplies amount to far more than the totals shown in the U. S. Government figures, as purchases by oil companies of steel pipe, pumps, wire, rope, boilers, lumber, piling, locomotives, boats, gasolene engines, Diesel engines, lighting-sets ditchers, tractors, trucks, automobiles, hoists, shovels, cranes, road building equipment, concrete mixers, rubber hose, dredges, houses, radios, refrigerators, hospital equipment and supplies, oil storage tanks, cooling towers, food supplies including canned goods, temperature instruments, gas station pumps, and numerous other things are listed under other export classifications.

The exports of gasoline station pumps not included in the foregoing figures, for the first six months of 1930 totaled 45,428 units valued at $1,471,696, compared with 128,077 units valued at $3,315,761 for the entire 1929.

Well over $100,000,000 in purchases, shipped to oil fields and refineries of the world, are made each year in the United States by American, European and Far Eastern oil companies, in addition to purchases made in other countries.

SHIPPING

London

CONSTRUCTION of tankers has at the moment fallen off. The charter market is weak and there seems to be very little indication that things will brighten in the near future. Many people consider that the market has been flooded with new tonnage and the fact that some of the large world charterers of tonnage, such as the Anglo-Saxon Petroleum Company (Asiatic Petroleum Company) are beginning to put large constructional programmes in hand again, has had a very quietening effect. Most of the past activity in tanker construction has been for ships designed to carry clean oils and most of these ships have been motor vessels. The tendency today is in fact for charterers to build almost exclusively motor vessels for the clean oil trades, as the latest Lloyds Register returns will show, although steam tankers, in the charter business at any rate, have still a strong grip on the dirty oil trades. This is, perhaps, logical because after all a great deal of steam is required in the dirty oil trade both for heating coils and for steaming tanks.

AMONG enquiries circulating through the shipyards for new tonnage, attention may be called to a very large and powerful tanker for the Argentine. This is for the dirty oil trade and will be steam propelled although in this connection the comparative lack of potential good Diesel sea-going engineers has a great deal to do with the choice of the owners. It is possible that the tanker building market, particularly the motor tanker building market, during the last year or so has received an artificial stimulus owing to the deferred payment system of financing new construction entered into by some of the big shipbuilders both in Gt. Britain and Scandinavia.

THE practice is in every way good as far as shipbuilding is concerned because it keeps the yards busy. Whether it is entirely sound from the point of view of oil transportation generally is another matter, particularly because it is likely from time to time to flood the market when the demand for chartered vessels falls off. An interesting case in point showing the way in which British shipbuilders have gone in for the standardization of tankers, is to be found in that of Sir W. G. Armstrong-Whitworth & Co. British shipbuilders have for so long been constitutionally opposed to anything savouring of standardisation in ship construction that it is of considerable interest to find that a yard like this large Tyneside concern has gone in for the production of a standard vessel which has been sold and is at the moment being sold to a number of Scandinavian owners.

IN all, ten of these ships have been constructed recently. All are off the same scrieve and there are only comparatively minor variations in the equipment to meet the different owners' requirements. Of these, the "Bisca," belonging to Per Gjerding, underwent trials on the 7th April this year and the "Evina," belonging to Hansen Tangens Rederi, underwent trials on the 16th May. These two vessels were delivered considerably in advance of the contract time, and with a deadweight of about 8950 tons attained a speed of 11¼ knots. Three other vessels of this type have now been launched and the rapidly approaching trial stage: a further unit was launched on July 25. The cubic capacity of the cargo oil compartments is 417,493 cu. ft. plus 2 per cent for expansion. There are eight main oil compartments and also four side compartments on each side of the vessel.

THESE vessels are built mainly with an eye to chartering in the clean oil trades and for that reason no heating coils are fitted in the main cargo tanks. The steel work is arranged however to take them if required at a later date. Vapor pipes are fitted. The oil-cargo pumps are two in number, each 14″ x 12″ x 14″, and the vessels of this type are fitted with a complete double oil-cargo pipe system, 10″ in diameter with 8″ suctions. The main propelling machinery comprises a single Armstrong Sulzer two-cycle Diesel capable of developing 2250 shaft horsepower at about 114 r. p. m. It is interesting to note, in view of the possibility of the new Tanker Freeboard Regulations coming into force, that these vessels are designed so that they can be loaded down to the deeper marks which the new regulations will assess to them. This is likely to appeal to a number of charterers. They have likewise a special raised trunk above the main expansion trunk.

New British Construction

AMONG the most novel of vessels at present building is a ship for Anglo-Saxon interests constructing at the Hawthorn Leslie Yard at Newcastle which is to carry sulphuric acid one way outwards to Curacao for refinery use and fuel oil homewards. This ship is shortly due for completion and will be named *Agnita*. She will have a deadweight of 4600 tons and a fully loaded draft of 23 ft. 3½ in. She will be a single-screw ship having an eight-cylinder Werkspoor, single-acting, four-cycle Diesel engine developing 2750 shaft horsepower at 110 revolutions. The ship is to be launched in November and is one of a total fleet of 30 tankers now under construction by the Anglo-Saxon Company, all of which are Diesel-engined ships. Twenty of these are large vessels of improved *Megara* type while the other 10 are smaller vessels for service in the Far East.

THE *Agnita* is easily the most interesting of these latter vessels. It is only possible to carry sulphuric acid in a steel tank, provided the acid is in concentrated form. A dilute solution, or even the presence of small quantities of moisture, would cause very rapid corrosion. In this case the acid is to be carried in 12 cylindrical tanks, six each side of the longitudinal bulkhead. The tanks are vertical, with domed ends, and extend from the floors, where they are supported on specially constructed stools, to a short distance above the upper deck. The tanks are, of course, subjected to very high test pressures, and each is capable of holding about 318 tons of acid. On the return voyage an oil cargo can be carried in the space between the tanks, and the design is so arranged that when carrying either oil outside the cylindrical tanks or acid inside, the vessel in each case is approximately loaded down to her Plimsoll mark.

Chartering

CHARTERING on the whole has been quiet during the month of July although during the week ending July 12 there was slightly more activity resulting in a fair number of fixtures. The amount of enquiry, however, appears to be still insufficient to maintain good freight rates, a further decline again being reported. Among English fixtures for this week may be mentioned the 4,000-ton tanker *Ramona*, chartered for 25/– Curacao and South Georgia, fuel oil outwards and whale oil homewards, the whale oil being South Georgia/U.K. Continent B/H or Frederikstad. A further similar charter is the 10,000-ton tanker *Thorshavn* fixed for December/January Gulf or Venezuela/Antarctic 27/– fuel oil combined with whale oil, Antarctic/U.K. Continent 42/–. This will indicate how well organised and commercialised the whale oil industry is becoming and indicates possibly a further outlet for tankers—possibly a welcome outlet at the present state of the market, although the tonnage absorbable in this is obviously small.

THE NEW 9000-ton motor vessel *Aase Maersk*, recently launched, has been fixed for August/September for 12 months in the whale oil trade. A glance through the charter fixtures of the last few weeks indicates that the motorships are still holding clean oil fixtures, while the steamers have the bulk of the black oil trade. Black oil chartering has, however, been fairly slow, the majority of fixtures having been for clean oil trade. The *Beaulieu*, one of the standard Armstrong Whitworth tankers, to which attention has been called above, was fixed about the middle of the month for August-September for Novorossisk/Bremen or Hamburg 17/– crude oil. This is one of the few cases in which motor vessels have been chartered for this work.

GÖTAVERKEN of Göteborg, Sweden, will shortly run trials of the 13,800-ton Diesel Tanker *Velma*, completing to the order of the Skibs. Nordheim of Oslo. Twin 2250 i.hp. Götaverken engines are fitted. Pipelines and valves have been so arranged that four various qualities of cargo can be loaded without fear of mixing occurring. Each suction branch is provided with double valves. The loading and discharging connections are fitted aft of the bridge-house with cross-over pipes to the port and starboard sides of the ship, and on each side there also is provided for a separate direct filling connection, so that cargo may be loaded without passing through the pumproom. A stern-discharge pipeline also is arranged. For bunkering similar connections are available.

Load Line Conference

THE WORK of the International Load Line Conference recently held in London in so far as it affects tankers, has been well summarised by Admiral Sir Henry Oliver who said: "The process of improvement in the design, construction and equipment of ships never stands still, and experience gained at sea is an ever-widening one. One of the improved types of ships which has developed during the last two decades is that known as 'tanker.' The United States of America, which owns the greatest number of these tankers, has found it possible to load them deeper than ordinary cargo ships, and has produced a great deal of evidence to show that their practice has been attended with perfect safety. On the other hand, some countries upon their experience have adopted the practice of deeper loading for ships carrying deck cargoes of timber.

Launch

THE motor tanker *Peter Hurll*, building for the Standard Shipping Company (Standard Oil Company of New Jersey), which was launched at Hebburn on July 24, is the 1,000th vessel built by Palmers Shipbuilding & Iron Co. Ltd., since the Jarrow yard was established by Sir Charles Mark Palmer and his brother nearly 80 years ago. Robert L. Hague, vice-president of the owning company, was present at the launching.

American Construction

IT IS the policy of some of the American oil companies to have steam installed in tankers built in the United States, but to fit Diesels in such tankships as they may have constructed in European yards. They consider that motorvessels are too costly when built at home. Nevertheless there are quite a few motor tankers under construction in American yards. The Sun Shipbuilding and Dry Dock Company of Chester, Pa., who it is said build motor tankers as cheaply as steamers, are building eleven Diesel tankers, of which nine are of 14,000 tons dwc., and are equipped with 2800 s.hp. Sun-Doxford opposed-piston engines. The other two are 500-ton coastwise-canal craft. The larger vessels are for the Standard Transportation Company (Standard Oil of New York), Tidewater-Associated Oil Transportation Company, and the Motor Tankship Corporation, which is believed to be associated with the interests closely connected with the Sun Oil Company. One of the Tidewater vessels was launched on August 9th. She will carry 116,000 bbls. gasolene. The Standard Shipping Company's tankers under construction are steam driven. The Lake Tankers Corporation (Royal Dutch-Shell) has four coastwise motor tankers building at the Bethlehem Shipbuilding Company's Fore River and Sparrow's Point yards, two of which craft are Diesel-electric driven. At the Federal Shipbuilding yard the United Petroleum Transportation Company has a small motor tanker building. Bids have been asked by the Gulf Refining Company on two 212 ft. Diesel barges, and prices on a 250-footer will be requested shortly.

Welded Construction

THE second American-built welded "rivetless" tanker is being built by Ira S. Bushey & Sons of Brooklyn, N. Y., for service in New York harbor. She will carry 125,000 gal. oil, and will be propelled by a 240 s.hp. Diesel engine. The Standard Oil Company of New York is also to build three little tankers, which will be but 88 ft. long and of 100 s.hp. Apropos the matter of higher speed for tankers and the question of steam vs. Diesel power, two 14-knot steam vessels are building for the Sinclair Refining Company at the Fore River yard of the Bethlehem Shipbuilding Company. Both are of 8400 tons dwc. and of 5000 i.hp. [The speed and power problem is discussed on page 369 of this issue.—EDITOR.] On July 20th the Standard Shipping Company's motor tanker *C. O. Stillman* carried a record oil cargo through the Panama Canal. She had aboard 23,000 tons (161,000 bbl.) of crude from Tayara, Peru, destined for Bayonne, N. J., U. S. A. She paid tolls of $10,908.75, or $47.37 cents per ton.

IF ALL marine Diesels can be made to burn boiler-oils successfully under ordinary conditions, the Diesel engine industry has a wonderful opportunity before it, as extensive adoption of hydrogenation is likely to make gas-oil and boiler-oil, both comparatively scarce and higher priced. This means expensive fuel-bills for oil-fired steamships. The motorship fuel-bills will be proportionately smaller due to the lesser consumption.

A. C. HARDY.

FOREIGN OIL LEGION

J. O. NELSON, JR., son of the treasurer of Gulf Refining Company, Pittsburgh, Penna., is spending several months in the oil producing fields of Venezuela studying the various operations. Mr. Nelson recently graduated from Princeton.

▼

HARRY F. SINCLAIR, president of the Sinclair Consolidated Oil and Refining Company, recently arrived in Europe from New York. Like many other oil company executives, Mr. Sinclair considers today is a particularly advantageous period for consolidation of independent oil companies. His company plans extensive expansion.

▼

J. H. STABLER, representative of the Venezuelan Gulf Refining Company at Caracas, Venezuela, formerly was in the U. S. diplomatic service in London, Paris, etc. When the executive-editor of WORLD PETROLEUM was in Venezuela, Mr. Stabler was extremely courteous and hospitable. It was through his kindness that audience with President Juan Bautista Perez of Venezuela was granted, when the plans for producing our new international oil journal were given a most encouraging reception. Mr. Stabler recently made a trip to New York.

▼

J. H. Stabler, who looks after Venezuelan Gulf Oil affairs at Caracas.

▼

DR. ROY MORSE, geologist, Shell Oil Company of California, is visiting headquarters of the Royal Dutch-Shell in Gt. Britain and Holland. After his business has been transacted, Dr. Morse will have a short vacation in other countries of Europe.

Col. H. C. Hickling (left), gen.-mgr., and L. A. Bushe, field-supt. of the Apex Oil Fields (Trinidad) Ltd.

▼

L. A. BUSHE, drilling superintendent of the Apex (Trinidad) Oilfields, Ltd., is on vacation in England. Last autumn Mr. Bushe, through the courtesy of Colonel H. C. Hickling general manager, conducted the executive-editor of WORLD PETROLEUM over his company's oil producing property in Trinidad. The Apex concern produces more oil than any other company in that British colony.

▼

CAPT. W. C. CLARK, marine agent of the Venezuelan Oil Company at Maracaibo, has just left Venezuela with his bride on a trip to Europe, whence he will shortly proceed to the United States, before returning to South America.

▼

JAMES A. CLARKE, general superintendent of the Lago Petroleum and Transport Corp. at La Salina, Venezuela, has recently returned to South America following a vacation in the United States.

▼

SIR HENRI DETERDING, head of the Royal Dutch-Shell combine, is caught in a characteristic mood in the accompanying snapshot, for which we are indebted to THE PIPE LINE, of London, the house organ of the Shell group of oil companies.

C. C. COULTS, general field superintendent, Burma Oil Company, which company's oil properties were illustrated in our last issue, and in our issue of April, is on a tour of the oil fields of the United States.

▼

D. J. MORAN, president, and E. J. Nicklos, vice-president, of the Continental Oil Co., have completed an inspection tour of the Company's holdings in Mexico. They were accompanied by Phil Messenger, general manager in Mexico and James Tatum, chief-geologist for the Company.

▼

FRANK C. LAURIE, general manager in Venezuela of the Lago Petroleum and Transport Corporation, recently arrived in New York on a business trip.

▼

V. V. JACOMINI, executive-engineer of C. F. Braun Company, Alhambra, California, is in Venezuela visiting the absorption plant now under erection at the Lago's Lagunillas field which his company recently constructed. Mr. Jacomini also inspected the absorption plant at El Mene which Braun recently completed for the British Controlled Oil Fields, Ltd.

▼

Sir Henri Deterding, head of the vast Royal Dutch-Shell oil organization.

French Petroleum Market Outlook

With Its Big Consumption and Insignificant Production of Oil Products, France Forms a Highly Competitive Market.

. . .

By E. J. André

Paris Correspondent of World Petroleum

THE French market undeniably is a happy hunting ground for the oil companies of all countries fortunate enough to have a large surplus available for export after taking care of internal requirements. During 1929 no fewer than 3,124,921 metric tons (21,874,447 bbl.) of petroleum products were absorbed by the French market. Each year greater quantities are consumed, and more and more money is being spent by the people of France for imported oils. This is the principal reason for the State taking an active interest in oil affairs, as its present policy is to encourage the development of a national refining industry, thus cutting down on imports of refined products and at the same time assisting home employment.

The following figures will clearly depict the tonnage of the different products imported during the past year, and also indicates where France obtains her principal supplies of crudes and oil products.

The only figures in the table given below which are under-estimated are these concerning crude oils, and this is due to the fact that in France, crudes can be imported into certain refineries without being taxed or controlled; they are dealt with by the customs and statistic office as finished products. It is, therefore, difficult to ascertain accurately the quantities that are imported. But they are conservatively estimated as 175,000 tons.

Since 1913 importations of petroleum products into France have increased steadily. The regularity of the growth is well illustrated by the following figures:

IMPORTS BY YEARS

Year	Metric tons	Percentage
1913	718,334	....
1914	600,549	— 16.40
1915	581,113	— 3.24
1916	821,439	+ 41.36
1917	796,736	— 3.01
1918	856,963	+ 7.65
1919	746,920	— 12.85
1920	1,076,966	+ 44.19
1921	861,034	— 20.05
1922	1,132,012	+ 31.47
1923	1,364,662	+ 20.56
1924	1,579,644	+ 15.75
1925	1,976,182	+ 25.10
1926	2,068,177	+ 4.66
1927	2,221,810	+ 7.44
1928	2,623,576	+ 18.08
1929	3,037,167	+ 15.76

The French customs have compiled the following statistics in order to arrive at a tangible basis as to the market demand for the various products:

CUSTOMS FIGURES

Products	Metric tons
Gasoline	1,675,625
Fuel-Oil	499,121

Imports of Petroleum Products (Metric Tons)

	Crude Oils	Refined Oils	Gasoline	Lube. Oils & Other Heavy Oils	Oils So-called Vase Lime & Paraf.	Gas Oil	Fuel Oils	Road Oils & Tar	Coke & Asphalt	Wax	Paraffine	Vaseline	Gen. Total	Per Cent
Algiers	2	244	448	14	..	..	..	..	..	..	2	..	710	0.02
Germany	35	462	449	2,554	59	144	..	3,283	262	71	339	2	7,660	0.25
Luxemburg	2	2,142	21,505	9,446	209	581	..	10	8	3	353	11	34,270	1.13
Egypt	..	4,294	33,390	..	..	..	..	15	..	..	..	..	37,699	1.24
United States	1	166,827	965,881	210,024	196	..	58,096	23,369	27,437	..	289	11	1,453,131	47.35
Great Britain	11	80	942	5,366	27	..	..	7,575	58	8	2,721	..	15,788	0.55
India	..	..	2,813	2	..	..	..	..	..	..	121	..	2,936	0.10
Dutch E. Indies	..	..	1,917	..	..	..	..	..	..	..	..	..	1,917	0.05
Mexico	..	19,189	9,256	59	..	..	2,117	27,179	19	..	..	..	57,819	1.90
Holland	..	16	1,239	42	..	15	12	1,905	1	..	..	..	3,230	0.11
Persia	1	22,110	333,255	13,235	..	11,811	116,729	2,969	3,133	..	710	..	503,953	16.0
Poland	..	2,309	827	2,940	..	7,267	..	513	66	..	2,535	..	16,457	0.54
Columbia	23,262	111	..	158	..	165	..	..	..	..	..	..	23,696	0.78
British Poss. on American Continent	..	..	328	..	..	..	..	..	..	..	..	..	328	0.01
Dutch Poss. on American Continent	..	..	29,768	16	..	9,611	113,130	..	..	..	..	..	192,529	5.02
Roumania	..	17,656	63,111	2,989	..	52,597	36,691	5,809	..	..	..	..	178,853	5.89
Russia	..	1,015	173,039	29,804	674	11,137	51,372	10,408	..	..	117	..	277,966	9.14
Tunis	..	..	..	..	..	23	..	..	..	..	..	..	23	..
Venezuela	76	445	35,231	3,370	..	64,685	120,814	33,682	..	..	..	..	298,303	8.50
Other Countries of Asia	..	..	645	..	..	..	160	..	64	..	..	..	869	0.03
Other Countries	..	104	582	224	4	7,327	..	175	..	..	17	2	8,435	0.28
Total	23,390	237,004	1,675,626	280,243	1,169	165,363	499,121	116,892	31,048	82	7,204	26	3,037,168	100

The French Government seeks to develop a national refinery industry.

Rouen is one of France's greatest oil ports. In 1929 imports of petroleum products amounted to 1,002,080 tons.

Lubricating oils	289,243
Kerosene	237,994
Gas-Oils (incl. Diesel)	165,363
Road Oils	116,892
Coke	31,948
Crude oils	23,390
Paraffin	7,294
Liquid Paraffin	1,169
Wax	82
Vaseline	26
Total	3,037,167

The explanations just quoted concerning some of the crude-oil figures must also be applied to these statistics, for certain imports are not included any more than are the supplies of fuel-oil and gas-oil (Diesel) consumed by the French navy.

We now come to figures giving total tonnage of product imported from each country by order of importance:

Origin	Metric tons	Percentage of general total
United States	1,453,131	47.85
Persia	503,953	16.60
Russia	277,566	9.14
Venezuela	298,303	8.50
Roumania	178,853	5.89
Curaçao, in the Caribbean	152,525	5.02
Mexico	57,819	1.90
Egypt	37,699	1.24
U. E. Belgo Luxembourgeoise	34,270	1.13
Colombia	23,696	0.78
Great Britain	16,788	0.55
Poland	16,457	0.54

The United States is easily ahead of all other countries, having exported to France 1,453,138 tons during 1929. It is almost surprising, however, that Persia should come a good second with a contribution of almost one-third of that of America, whereas other important oil producing countries such as Venezuela, Roumania, etc., lag very far behind. Most of these countries, nevertheless, are increasing their exportations to France. Figures show that in 1928 America contributed to the extent of 50.94 per cent; whilst Persia only shipped 15.94 per cent; Venezuela 3.9 per cent, and Roumania 3.87 per cent, as against 16.60, 8.50, and 5.89 per cent respectively, in 1929.

Local Production

Local production is very limited, nevertheless the S. A. PECHELBRONN, which continues to work its mines with praiseworthy persistence, produces roughly 70,000 tons per annum. During 1929 more was obtained — i.e., 71,622 tons, whilst the government extracted 2,874 tons at GABIAN, and the S. Lyonnaise des Schistes Bitumineux distilled 4,822 tons of oil from shale obtained at AUTUN.

During the course of the year the S. A. PECHELBRONN refined 96,447 tons of crude oil of which 23,262 tons were imported from Colombia. The following products were obtained from this crude oil:

Lubricating oils	32,967	tons
Kerosene	19,239	"
Road oils	15,334	"
Gasoline	8,337	"
Gas-oil	7,697	"
Fuel oil	5,734	"
Paraffin	1,932	"
Coke	925	"
Total	92,185	"

Total consumption for the whole of France amounted to 3,037,167 tons of imported products, plus 95,577 tons of national products; in all 3,132,744 tons.

Chief Terminals for Petroleum Imports

The following are the principal ports of entry for petroleum products shipped to France, and these have been arranged in order of their importance:

	Tons imported	Percentage
Rouen	1,002,080	32.99
Marseilles	537,600	17.70
Le Havre	355,175	11.69
Bordeaux	255,494	8.41

American and European petroleum products on sale at a service station in the suburbs of Paris. Note old methods and absence of pumps.

Dunkerque	163,891	5.40
Site	138,265	4.55
Lille	126,809	4.18
La Rochelle	105,852	3.49
Saint Nazaire	79,225	2.61
Brest	79,202	2.61
Strasbourg	58,879	1.94
Cherbourg	29,651	0.98
Sarrebruck	27,484	0.90
Metz	25,937	0.85
Jeumont	10,618	0.35
Paris	9,551	0.31
Calais	5,977	0.20
Saint-Malo	3,028	0.10
Bastia	2,270	0.065
Bellegarde	1,461	0.05
Charleville	766	0.03
Caer	360	0.01
Valercienne	162	0.01
Dieppe	127	0.005
Other ports	17,309	0.97
	3,037,168	100 per cent

Consumption of Products in French Districts

The consumption of petroleum products in France varies a great deal according to the district, in some parts of the country much greater quantities are required than in others. The best way of establishing as to which districts consume the most products is to take the different automobile horsepower figures registered for taxation. Paris, of course, heads the list and the other industrial regions follow immediately after:

Districts	H.P. Registered
Paris	2,405,993
Lille	595,522
Lyons	447,872
Suburbs of Paris	443,126
Bordeaux	397,292
Marseilles	373,985
Havre	363,936
Nice	337,821
Cherbourg	259,838

Modernistic gas station at Pacy offers good advertising points.

Fluctuation of Prices

The wholesale prices of petroleum products in France fluctuated between the following figures during 1929:

		Francs per hectolitre
Gasoline (high grade)	between	209 and 212
Gasoline (low grade)	"	199 and 202
Kerosene	"	182 and 192
Gas-oil	"	580 and 670
Fuel oil	"	465 and 545

As already explained the French market is by no means entirely free. It is regulated to a certain extent by import licenses, and the Office National des Combustibles Liquides has also been known to intervene when competition has become cut-throat and when price wars have been of too long duration.

It is thus that in January, 1929, the government established charges for three different classes of importers. The figures were furnished by the importers themselves, we can therefore surmise that the details are correct.

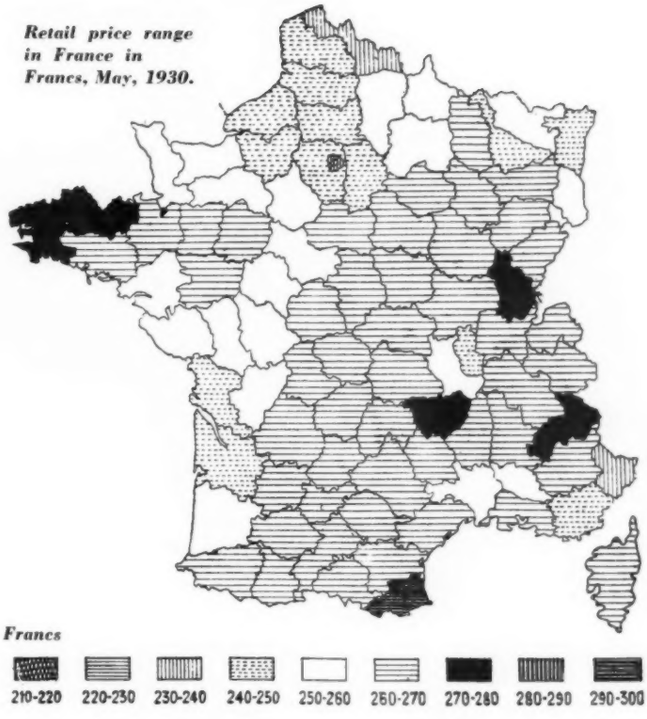
Scale of prices for high-grade gasoline established on the 24th of January,

Scale of Gasoline Import Charges

	Chambre Syndicale de l'Industrie du Pétrole	Independent Importers (A) Large	(B) Small
	Prices in francs		
(1) Cargo, one English ton	949.76	949.65	949.67
Freight	108.60	108.60	108.58
Inspection ex's, 2c	0.51	0.52	0.52
Insurance 0.25 per cent	2.61	3.32	2.65
Evaporation and loss 1.5 per cent	15.95	10.58	15.95
Interest on Overdraft, 30 days per annum at 6 per cent	4.75	4.75	....
Credit ex's. 1/16 per cent	0.59	5.75	5.63
C. I. F. Eng. tons Total	1,082.77	1,083.17	1,083.00
C. I. F. Metr. tons "	1,065.71	1,066.10	1,066.00
(2) Unloading, toll and other charges	4.00	3.50	5.50
Shipping charges	.....	.....	.....
Rent, stocking three months	15.00	41.10	51.00
Insurance, buildings and warehouses	0.36	3.20	.....
Warehousing	2.75	2.00	.....
Losses at warehouses 2 per cent	21.31	21.32	21.00
Insurance on merchandise, 3 months	1.73	3.20	5.00
Interest on stock, three months at 6 per cent per annum	16.00	15.99	16.00
Total	1,126.86	1,156.41	1,164.50

(Table continued on page 381)

River transportation in France provides low-cost movements of gasoline and oils.



Retail price range in France in Francs, May, 1930.

1929, by the Office National des Combustibles Liquides, is given on the table on page 379, which is continued on page 381.

Having before me the actual cost to the French importer of one hectolitre of high-grade gasoline it is interesting to see what the retail prices are in the different provinces. The best way to illustrate this is to re-produce a map published once a month by one of the French oil-trade journals which gives the highest and the lowest gasoline prices in each department.

Categories of Importers

A few words of explanation concerning the different categories of French importers of petroleum products are necessary. I already have said that there are three. The Chambre Syndicale de l'Industrie du Pétrole comprises all the biggest distributing companies in France, i.e., the Sté l'Economique (Standard Oil of N. J.) the Sté Jupiter (Royal Dutch-Shell) the Sté Generale des Huiles de Pétroles (Anglo-Persion) Desmarais, Cie Industrielle des Pétroles, etc., etc. These companies between them hold almost 75 per cent of the existing importing licenses. The so-called "Independents" hold about 20 per cent, and come under the heading A in the scale of prices established on January 24th, 1929. There remain the small importers (heading B) who can only import 300 tons a month; they are quite numerous and already exceed 800 in number.

Most of these small importers have obtained licenses in order to satisfy their own personal requirements; others have done so in order to sell either the total tonnage in bulk, or to the retail trade. Whatever the aim, and whoever the importer may be, he is obliged by law to put into stock a quantity of products representing one-fourth of his sales of the previous year. These stocks amounted to 7,082,622 metric quintals (one metric quintal is equal to 3.936 hundredweight) on the 1st of February, 1929, and are a very expensive item in the importers' budget.

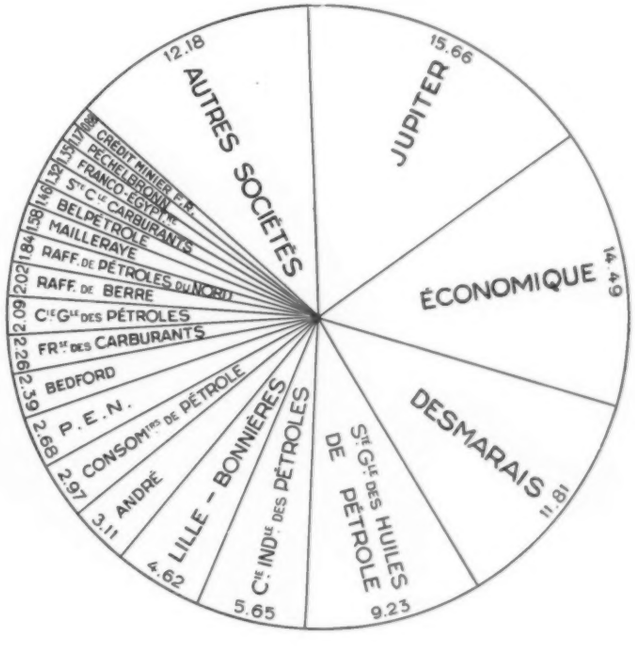
A second obligation imposed by the government, and which is strongly resented by the distributing organizations, is having to mix 50 per cent alcohol to the low-grade gasoline in order to make what is termed the "Carburant National." This is another source of loss for alcohol costs more than the low-grade gasoline.

Exports

France re-exports small quantities of gasoline and other petroleum products to her Colonies and elsewhere.—The total quantities for 1929, and their destinations, are enumerated below:

	Metric Tons	Percentages
Algéria	23,646	27.11
Germany	13,999	16.05
Provisions de bord (nav. étrang.)	12,267	14.06
U. E. Belgo-Luxembourgeoise	7,113	8.15
Switzerland	4,052	4.65
Morocco	3,511	4.02
French West Africa	3,492	4.02
Madagascar	2,591	2.97
Tunis	2,252	2.58
Italy	1,118	1.28
Spain	948	1.09
Indo-China (French)	903	1.03
Great Britain	525	0.60
United States	156	0.17
Other Countries	10,663	12.22
	87,236	100%

Value in Francs: 18,570,000.



Proportion of French petroleum import licenses.

Transport

All petroleum products in France are transported either by water-way, road or railway in tanks or barges. Arrangements for storing stocks have been made all over the country, and the curb pump system for retailing is becoming more and more usual. This is a fairly recent development, and there is still room for improvement. Ugly barrels and wooden boxes containing five-liter cans of gasoline are still to be seen dumped on the pavements outside garages and grocers' shops all over France.

It is two years, or more, since the first "service station" was built, as modern and well equipped as any in the States; but as yet they are not very numerous.

Competition on the French market is very pronounced, especially around Paris; but as consumption is steadily increasing, an equitable arrangement is usually arrived at to the satisfaction of all.

Licenses

As published on page 334 of the August issue of WORLD PETROLEUM, the Minister of Commerce on August 1st authorized ten new import licenses for refined petroleum products, permitting a total of 232,640 tons additional to be imported. The names of the companies receiving the licenses were also published in this journal. These permits made no change in the situation.

Import Charges, (Continued from page 379)

		Francs	
i.e. price per hectolitre	81.70	84.41	85.00
(3) Customs duty	44.00	.....	.....
Taxes	28.00	.....	.....
Stamp duties and commiss.ons	0.08	.....	.....
Tax ad valorem	0.12	81.15	81.15
Supertax	5.00	.....	.....
Importation tax	3.12	.....	.....
Tax for the benefit of the O.N.C.I.	0.73	.....	.....
Losses	0.50	0.50	0.50
i.e. price per hectolitre	163.25	166.06	166.65
		Francs	
(4) Insurance on stock (paid) 1 month, 0.08 per cent	0.11	0.12	0.13
Losses on stock (paid)	1.65	1.66	1.67
Interest on stock (paid) 1 month	0.83	0.83	0.84
Overhead expenses (working and depreciation):			
(A) Receiving, pumping, stocking, filling, repairs, packing, cleaning, painting, supplies, and loading	9.82	4.50	6.00
(B) Rent, housing, up-keep, equipment, etc.	3.11	0.35	1.50
(C) Depreciation of equipment and buildings	2.29	1.75	.....
Depreciation of pumps	2.96	.....	4.50
Depreciation of packing equipment	2.53	3.25	.....
(D) Losses refunded to customers	1.45	.....	.....
(E) Bad debts	0.40	1.20	2.00
Insurance on buildings and equipment	0.09	0.10	0.20
Agents' commissions	1.55	1.50	2.00
Expenses of management and publicity	4.40	2.50	3.40
Carriage to wholesale trade	3.15	3.50	4.00
Interest on advances to customers (one month)	1.00	1.00	1.00
Tax on turnover	4.00	4.00	4.00
Margin for risk, interest on immobilizations, and benefits	9.45	9.00	9.00
i.e. price per hectoliter	212.04	201.32	206.89

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Irak Still Bone of Contention

By Dr. Richard Lewinsohn

Financial and Commercial Editor, Vossische Zeitung

Germany—By Cable

THE visit of King Feisal of Iraq to Berlin has raised the supposition that important negotiations are underway between the government of Iraq and the German industrial groups regarding large contracts for oil field equipment and pipe line construction. As a matter of fact there have been several conferences between Feisal and representatives of German industry, but I am able to state authoritatively that no deals have been closed; so far, there has been only a tentative feeling out of the position that has not yet led to positive results.

The whole thing seems to be resolving itself into a struggle of English, American, and French interests against the Iraq Petroleum Company (I. P. C.). The British Oil Development Company (B. O. D.) has been trying for two years to obtain concessions in Iraq. The Chief representative of B. O. D. is the British admiral, Lord Wester Wemyss, who is being supported by influential English industrialists, in partcular Lord Inverforth, who is heavily interested in the B. O. D. group, and appears to have close personal relations with the Anglo Persian and Shell groups. Participation is being offered the Germans in any concessions which the B. O. D. may obtain, but the English wish to retain the majority interest for political reasons, in view of the fact that the League of Nation's mandate over Iraq extends through 1932. Among other foreign capitalist groups to whom participation has been offered, are the Agenzia Generale Italiana di Petrolio, 12 per cent, the French-Swiss group 12 per cent, and the Deutches Industriekonsortium, 12 per cent.

Among the principal interests in the German group are Krupp, the Hamel concern, and Otto Woeff the German iron magnate. The most active spokesman for the German interests is Herr Brown of Berlin. If the B. O. D. obtains the Iraq concession the Germans are promised 38 per cent of the equipment orders.

Between Lord Wemyss and King Feisal there exists a strong bond of friendship dating from the war, and the noble lord is bending every effort to secure the concession. But the I. P. C. has prior rights on 24 locations, each covering 8 square miles. The Iraq government is free to grant concessions on other oil lands, but in these the I. P. C. also has a contractual right to participate. Wemyss is said to be making great efforts to have this privilege abolished. He is alleged to have promised to construct at once a railroad and a pipe line across the Syrian desert to Haifa without requiring any governmental assistance or guarantee; further, to make a loan of £2,000,000 to the Iraq government and to pay £75,000 into Feisal's private treasury. Wemyss is also involved in the case of the mysterious 19 heirs of the late Turkish Sultan Abdul Harnid, who are alleged to have claims on the Iraq oil fields. Other means for creating legal difficulties are not altogether absent, because the I. P.

(Continued on page 387)

Building a Great Oil Business

How the Oldest Lubricating Oil Company Developed Business in Every Consuming Country in the World Except One. A Sixty-four Years' Industrial Growth . .

FEW stories of the growth of great corporations are more romantic than that which records the development of the Vacuum Oil Company from an idea shared by a Rochester (N. Y.) grocer and a Rochester carpenter to an organization whose products are familiar in every corner of the civilized world.

It is probably the oldest and certainly one of the oldest oil companies in business today, for it was established, under its present name, in 1866, only seven years after Drake's discovery well in Titusville, Pennsylvania, opened the petroleum era. Although it is not the largest oil company in the world, it is unquestionably the largest company making the manufacture and sale of lubricants its specialty and is generally credited with having introduced petroleum lubrication to the world. Among oil companies, it has been and is a leader in the enterprise and aggressiveness with which it has developed that phase of the industry.

In the early days of the petroleum industry, kerosene was the only product commercially important. Gasoline was dangerous and was destroyed. The residue of distillation was considered to be of no value, and, like gasoline, was regarded as a nuisance. Some efforts had been made to utilize the residue for lubrication of the rougher kinds of machinery, but owing to the scorching and burning of this residue in the crude forms of distillation employed, these efforts met with little success.

Hiram B. Everest, a Rochester grocer who had been a farmer, was led to invest in the development of a vacuum still invented by a local carpenter, one Matthew P. Ewing. Ewing's still was expected to change the entire crude oil content into kerosene and the Vacuum Oil Company was formed in 1866 to manufacture under this new, and as it proved, revolutionary process. Of course it did not accomplish all that had been expected of it, but Everest saw interesting possibilities in the residue which, thanks to distillation under vacuum, came through unscorched and unburned. One of these possibilities was its use as a lubricant. Another use was in the currying of leather. The Vacuum Oil Company, started in a small way, made such slow progress in its early stages that Ewing became discouraged and sold his interest.

For the first few years of the company's history the industrial world was decidedly distrustful of the new lubricant. Much of the time of Vacuum's small organization was taken up with trips to satisfy users that petroleum lubricant was superior to the tallow and fat which previously had been used. One by one, users were shown that their distrust was unfounded and within a few years petroleum lubrication reigned supreme. This trouble-hunting work had a great influence upon the future of the Company for it taught the organization early in its career the great necessity for understanding the conditions under which a lubricant is to be used. Thus was born the idea which led in later years to the company's slogan "a grade for each type of service."

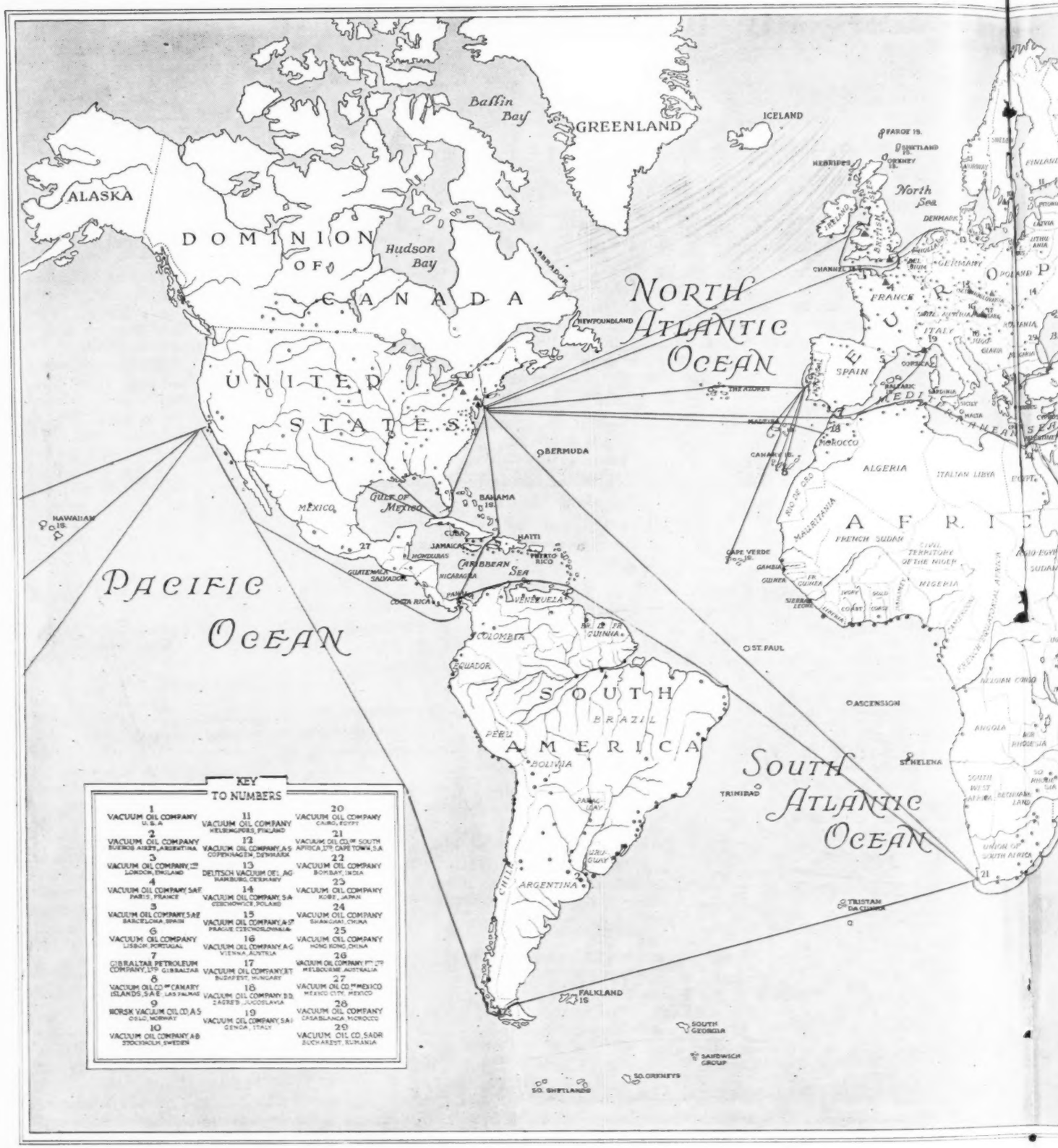
Everest made almost a fetish of quality and very soon developed his organization along the lines of "quality first." He found a public willing to pay the small amount that he had to add to his selling price to assure the use of the finest products and the most exacting, scientific and painstaking methods possible. From the beginning until today the company has been outstanding for the importance it places upon research work.

Although the early days of the company were difficult, its growth was constant. Everest was an excellent merchandiser as well as a careful, conscientious manufacturer. Over a growing field recognition of the quality of the new products spread and the Vacuum Oil Company became more sure of its place in the sun. In 1879, control was purchased by the old Standard Oil Company which saw the need for an affiliated organization to manufacture lubricants of a higher grade than could be produced in the ordinary refineries specializing in kerosene. Shortly after the sale, Mr. Everest retired from active participation in the company's affairs, although he held the title of president of the Company for many years after.

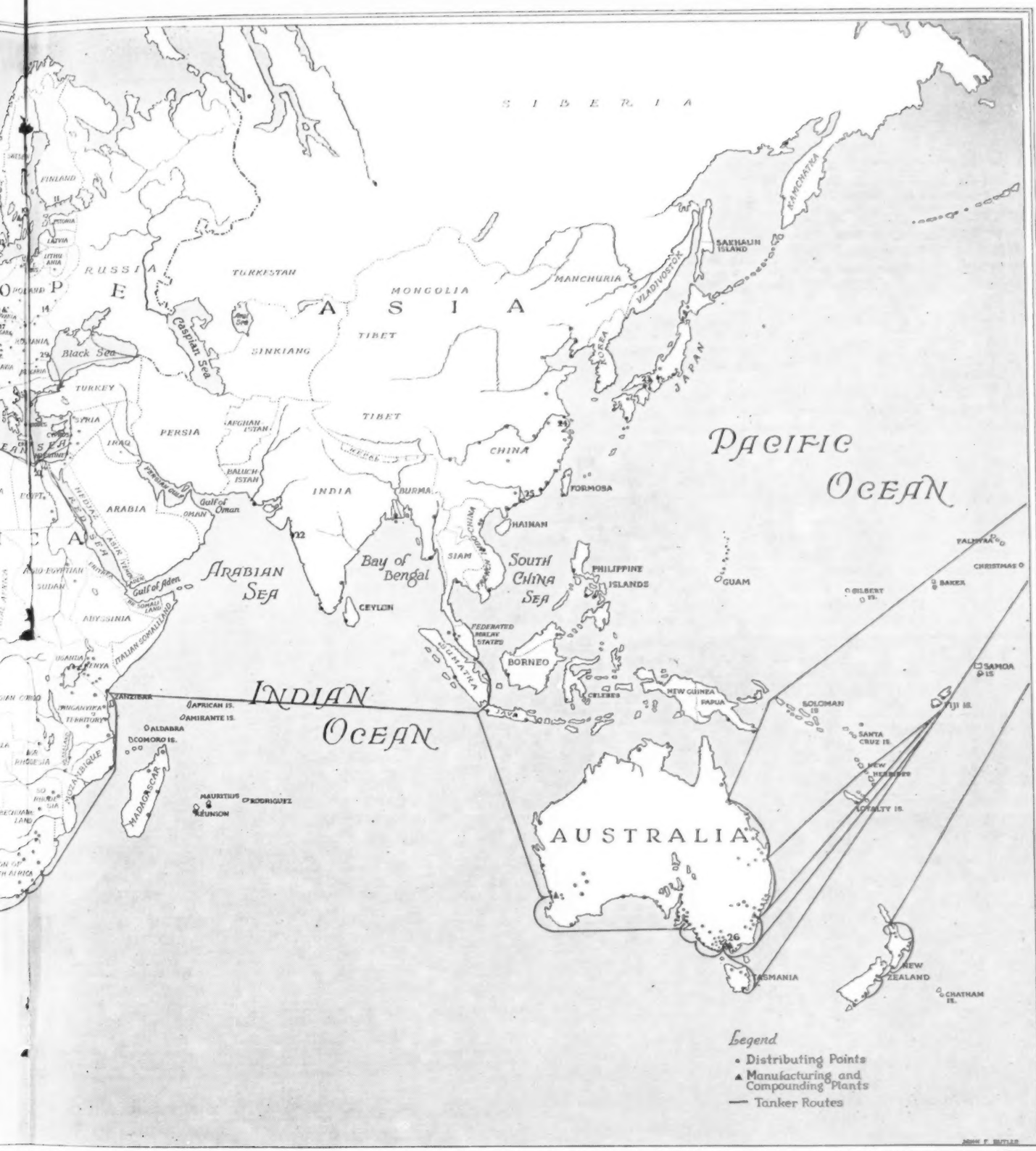
He left with the organization, however, his son, C. M. Everest, whom he had trained to succeed him. The younger Everest quickly proved himself to be a business man of remarkable ability and unusual vision. Under his direction, the Vacuum Oil Company spread its sales activities throughout the United States and into the old world. It was at this time, with the assistance of other far-sighted executives, that the Company entered

VAST in its scope, complex in its organization, bridging seas and continents in the range of its activities, and calling for the exercise of a high degree of skill in management, the business structure of a great oil company is a highly interesting subject for study. It is the purpose of "World Petroleum" to present in its editorial pages from time to time authoritative articles descriptive of the structure, equipment and operating methods of some of the larger international producing and marketing organizations hitherto unpublished.

This month the wide ramifications of the oldest oil company in the international field are comprehensively pictured in the accompanying paper, which also has the merit of revealing the animating spirit of this particular business and its success in maintaining a direct and friendly contact with consumers in all parts of the world. Only through the helpful collaboration of the company officials and their readiness to supply all needed data has the presentation of the article been made possible.



BRIDGING SEAS and continents in the range of its activities



▼ . . . . . **INTERNATIONAL BUSINESS structure of the Vacuum organization.**

upon an extensive research program that has enabled it, throughout all of the years that followed, to hold its leadership in the field of lubrication. The history of many industries could be written completely only with some recognition of the part played by lubricants developed to meet new needs in the course of this oil company's constant research.

In 1885 the fame of Vacuum products had spread across the Atlantic and there soon developed a considerable demand abroad. As an experiment, then considered somewhat daring, a few carloads were sent to Liverpool and a local representative appointed. The success of the experiment was quick and surprising and the company's sales organization soon spread to the continent. Today, more than twenty-nine foreign branches and foreign Vacuum Oil Companies are engaged in marketing their products in every corner of the globe where lubricants are used. Only in Soviet Russia is the company without representation.

The original refinery at Rochester grew until it covered many acres, but the need was felt for a refinery nearer the principal sources of the crude oil used in its production. Accordingly, two small refineries in Olean, N. Y., in the upper district Pennsylvania section, were purchased and combined to form the second Vacuum refinery. These two refineries, constantly growing, together met the needs of the Vacuum organization for several years. Then it was found necessary to have facilities on the seaboard and a plant was built in Bayonne, N. J.

As the Vacuum organization grew it was fortunate in having attracted a number of able young executives which resulted in an organization of great executive strength and promise.

This was most important when, in 1911, the old Standard Oil organization was dissolved and the Vacuum Oil Company became once more an independent institution. In addition to executives who had been closely associated with the organization for several years, several men of considerable ability left the Standard Oil Company to associate themselves with this most promising of the new independent companies. The growth of the Company has been due in a very great measure to the unusual skill with which its affairs are directed and to the emphasis which is placed upon the development of the personnel throughout the entire organization.

Convinced of the future in the petroleum lubrication business not only in America but abroad, the organization celebrated its new independence by setting out upon an ambitious program that has grown greater with the years. Leader in its own field then, it determined that the leadership should be maintained. Every year was looked upon as a year of progress and each year has justified the Company's expectations.

Early in its history as an independent organization the Company started upon an extensive and aggressive campaign of advertising, telling the world of the vast amount of scientific research it was putting into the development and manufacture of fine lubricants and leading the way toward a greater recognition of the importance of quality in lubrication. Part of this scientific program included the expert examination of every type of machinery in commercial use and the development down to the correct grade of oil for its lubrication. This expert study of machinery and the resulting great accumulation of knowledge of the needs of the various types of machines and conditions of service aided mightily in the research work that was pushed forward with renewed vigor in the effort to make oils that were scientifically correct for the work they were expected to do.

The Company's business grew to such an extent that it was determined to build, near New York, a refinery that was to be the most modern that could be devised for the production of lubricants. The refinery

Ocean tankships and freighters dock at the Paulsboro, N. J. refinery

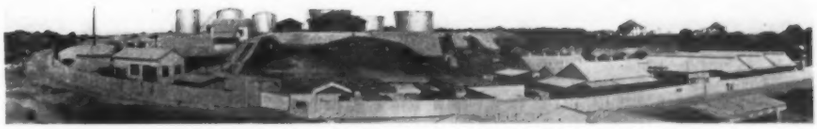
was started on the Delaware River, at Paulsboro in 1917, and it was in service less than a year later. Vacuum officials, however, decline to set a date for its completion, for they say that there has not been a day since the beginning of its operation that important construction work has not been in progress. The plant covers nearly a thousand acres. In the meantime, constant engineering research and development work has kept the other Vacuum refineries up to date.

In all its enterprises the Company makes every effort to keep in as close touch as possible with the ultimate consumer. Much of its domestic market is supplied through its branches strategically located in the principal American cities, or by marketers who handle the products in close cooperation with the Company's staff of sales experts. Quality, of course, always has been the keynote, but much of the results are due to the unusual understanding of marketing methods and to meeting the ever changing conditions of the field in which it operates.

Abroad, the Vacuum organization spread rapidly. In England the local representative of the Vacuum Oil Company was succeeded by an organization which extended its business through the greater part of Europe. This was succeeded later by the Vacuum Oil Company, Ltd. From humble beginnings grew the Vacuum Oil Company, S.A.F., of France, the Deutsche Vacuum Oel A.G. of Hamburg, the Vacuum Oil Company, S.A.I., of Genoa, to mention only a few of the companies operating in Europe. From similar efforts in other lands grew the Vacuum Oil Company Pty., Ltd., of Australia and the Vacuum Oil Company of South Africa, Ltd., at Capetown. There are now twenty separate Vacuum Oil Companies in the world and many important branches. Plants in many lands help to supply the demand abroad for products made according to Vacuum standards. Throughout the world Vacuum has upward of 16,000 employees.

In many countries abroad the peculiar demands of the local territory have led to the development of extensive trade in gasoline and kerosene, in addition to the lubricants with which the name Vacuum was more closely associated in most lands. In Africa, Australia and Central Europe the trade in refined oil products is particularly important.

As there are twenty foreign Companies and nine foreign branches or divisions covering in a sales way all of the world except Soviet Russia, it is manifestly impossible to give in the space available, an adequate picture of activities in foreign lands. A few examples will give an idea



Installation at Mombassa of the South African company.

of the sales policies throughout the world for all of the Vacuum companies are very much alike.

The British company has two plants, one at Birkenhead and the other at Wandsworth. The two plants are especially equipped for handling high grade lubricating oils and greases, the Birkenhead works housing one of the most important grease manufacturing plants in the British Empire.

In order to make its products easily available in all parts of the British Isles the Company maintains 34 warehouses provided with adequate facilities for transporting its products to the trade.

Nine tankers in the Gargoyle fleet, with a total deadweight carrying capacity of 85,758 tons, are owned by the Vacuum Oil Company, Ltd.

Fourteen district offices, three in London, and the remainder in Belfast, Birmingham, Bradford, Bristol, Cardiff, Dublin, Glasgow, Liverpool, Manchester, Newcastle-on-Tyne and Sheffield, make it possible for the Company to maintain the close contact with its customers that is characteristic of the selling technique adopted throughout the world. The local marketing is handled under the direction of nineteen district managers, five of whom are occupied exclusively with the company's marine trade. Under their direction are 25 assistant managers and 177 salesmen. In addition, 25 engineers are required to provide the engineering service for the sales organization.

The Vacuum Oil Company, S. A. F. of Paris is another of the strong companies abroad. This Company markets products

Warehouse of the Italian company at Naples.

under the familiar Gargoyle brand in France, Belgium, Holland, Switzerland, Algiers and Tunis. The Company's main works are at Rouen, where 700 workmen are employed. A refinery is to be built at Port-Jerome. This refinery will be one of the most modern plants of its kind abroad, and will compare favorably with Vacuum refineries in the United States. The Company has 114 warehouses throughout the territory which it serves, and has sales offices in eight cities in France in addition to the headquarters offices in Paris. Additional sales offices are maintained in Holland, Belgium, Switzerland and the Duchy of Luxemburg, Corsica, Algeria and Tunis. In its headquarters office alone it has 487 employees.

A third important foreign company is the Vacuum Oil Company, Pty., Ltd., of Melbourne. The Australian company's territories cover approximately 3,000,000 square miles—slightly more than the area of the United States. The population of the island continent is about 8,000,000, the bulk of it being spread along the coastline. Of the inhabitants, 98 per cent are of British stock. The standard of living is high and this company serves what is very decidedly a quality market.

The Australian company differs from the companies already mentioned, in that it is an extensive marketer of gasoline and kerosene. Operating through Australia, New Zealand and the other islands of the South Pacific, it began business in 1895 and has just completed its 35th Anniversary. The company has 3,000 employees, including 300 salesmen. Large manufacturing plants are located at Melbourne (Victoria), Sydney (New South Wales), Perth (Western Australia) where many of the products sold by the company are made. In addition to marketing its own products and the products of the Vacuum Oil Company, New York, this company has an extensive business in stove and heater products. It has 33 branches and three agencies.

Australia up to this time has produced practically no crude oil. Overseas tankers supply 15 main bulk storage installations with kerosene and gasoline. Located at strategic points are 179 smaller bulk storage installations. The company's gasoline is distributed to the public through more than 9,000 curb-side pumps. Eight chartered tank steamers supplement the

carrying capacity of those vessels of the Gargoyle fleet which ply between the United States and Australia. Package goods, including lubricants, are supplied from many other warehouse points—the total being more than 1,000. In addition, continuous use is made of 151 railway tank cars and 375 tank wagons.

In every part of the world, the local Vacuum organization is an important unit in industry. The Deutsche Vacuum Oel, A.G., for example, markets Gargoyle products throughout Germany. It has headquarters in Hamburg and six branch offices in important industrial areas. The Deutsche Vacuum Oel, A.G. has two refineries, one at Schulau, near Hamburg, and another at Oslebshausen near Bremen.

Business in Central Europe is handled by: The Vacuum Oil Company, A.G., Austria, the Vacuum Oil Company, A.Sp., Czechoslovakia, the Vacuum Oil Company, R.T., Hungary, the Vacuum Oil Company, S.A.d.R., Roumania, the Vacuum Oil Company, D.D., Jugoslavia, Bulgaria and Albania, and the Vacuum Oil Company, S.A., Poland. In Central Europe there are four refineries and fourteen branches of the various companies. The refineries are at Fuzito, Hungary; Dziedzice, Poland; Kolin, Czechoslovakia, and Kagran, Austria. These companies market refined oil products in addition to lubricants.

The Vacuum Oil Company, S.A.I., covers distribution in Italy and in Libya in Africa. It has a manufacturing plant at Vado, and its headquarters are in Genoa. There are branches in nine other cities in Italy and agencies in Sardinia, Sicily and Tripoli.

Five organizations serve the countries of and adjacent to the Iberian peninsula. One of these is the Vacuum Oil Company, S.A.E., of Barcelona, which has five sales branches throughout Spain. Another is the Vacuum Oil Company of the Canary Islands, S.A.E., which has headquarters at Las Palmas and a branch at Teneriffe.

The 25th anniversary of the Vacuum refinery in Poland was recently celebrated.

A branch of the Vacuum Oil Company, New York, has headquarters in Lisbon with branches throughout Portugal and the West Coast of Africa. The Vacuum Oil Company, New York, has another branch with headquarters at Casablanca and with branches throughout Morocco. Another "foreign" Vacuum Oil Company is the Gibraltar Petroleum Company which has headquarters at Gibraltar. This group of organizations has thirty-three branches and six agencies in the area generally adjacent to the entrance to the Mediterranean.

Scandinavia is an important market for lubricants and five organizations handle this business in the great industrial areas north of the Baltic. These are the Vacuum Oil Company, A.S., of Denmark, the Vacuum Oil Company, A.B., of Sweden, the Norsk Vacuum Oil Company, A.S., of Norway, and two branches of the Vacuum Oil Company, New York—one in Finland and one in Latvia. They have manufacturing works in Bergen, Norway, and Stockholm, Sweden, and branches, agencies and distribution points at strategic positions in this region.

In the Levant, that ancient center of commerce, the Vacuum Oil Company maintains an important sales activity with headquarters in Cairo. Under the directions of the Cairo office are twenty branches and numerous agencies of the Near East Division covering sales activities in Egypt, the Sudan, Syria, Palestine, Greece and Turkey and Cyprus. In this territory there are more than 700 employees, and approximately 60 per cent of these are natives of the regions in which they work.

Another important marketing activity is that of the Vacuum Oil Company of South Africa, Ltd. This organization sells, as do all other Vacuum Oil organizations operating in Africa, both refined oils and lubricating oils. The headquarters is in Capetown with various branches and agencies extending from South West Africa around to the East Coast and as far as Abyssinia and Italian Somaliland.

In the Eastern lands activities are no less extensive. A branch of the New York company has headquarters at Bombay. Under the direction of this head office are five branch offices from which an extensive business with industry in India and Burma and the adjacent countries is transacted. This division of activity provides employment for 227 persons, about half of whom are natives.

Two branches of the Vacuum Oil Company, New York, carry on an important business in China and some of the adjacent countries. The South China Division has head offices in Hong Kong and Shanghai is the headquarters for North China operations.

The activities of the South China Division extend south from Foochow to the Dutch East Indies, including French Indo China, Federated Malay States, Siam, the Philippines and the Islands of Borneo and Celebes and New Guinea. Eleven branches and eighteen agencies represent Vacuum in this region. The head office at Shanghai directs sales activities in the region North of Foochow and south of Harbin and extending west to Turkestan. Two branch offices and twelve agencies serve this area.

Japan is served by a division of the New York company, with headquarters at Kobe. Eleven branch offices cover the entire empire and other branch offices handle business in Formosa and Korea.

Coolies loading lubricating oil on carts in Tokio

The Vacuum Oil Company, Kobe, has 232 employees, of whom 90 per cent are Japanese.

In South America, the head office for the region south of Colombia, Venezuela and Guiana, is at Buenos Aires. Forty-seven branches and agencies and many sub-agencies make Gargoyle products available in all parts of this Continent.

In Central America, there is one foreign division, the Vacuum Oil Company de Mexico, S. A. This organization, with headquarters in Mexico City, has numerous branches and agencies throughout the Republic.

Vacuum never has centered its attention upon the production of crude oil in as much as the manufacture of its lubrication specialties requires selected crudes from many different fields. However, as a background for its white-products business it has developed production in certain fields. It is one of the largest buyers of Pennsylvania crude, having its own pipe line gathering systems in Pennsylvania. Vacuum also entered upon extensive production operations in the southwest. Except for its own pipe lines in the Pennsylvania district, the company depends upon its own fleet of tankers for the transportation of crude oil to its refineries. Flying the house flag and carrying crude oil to its refineries and finished products to its markets in all parts of the world are twenty-two tankers, and many smaller vessels are used in the harbors of the world. In addition, large quantities of products in cases are carried to the markets of the world on freight vessels.

It was long a practice to deal directly with the consumer, and in a great part of the world this practice is still adhered to. A favorite story of the Vacuum organization concerns a ship which stopped in a remote port. The first man to come over the side greeted the captain:

"Sir, do you know who I am?"

"No," said the captain, "but from past experience, I should say that you were the Vacuum representative."

He was.

Of course, the growth of the automobile industry gave the Company a great opportunity, but it has also made it impossible to continue maintaining direct contact with the individual motorist. In most parts of the world, however, the company deals directly with the individual dealer. Today, throughout the world, Vacuum automotive products are sold by a vast army of dealers. In the United States alone, approximately 80,000 dealers sell Mobiloil, the company's automotive lubricant. In foreign lands from 80 to 90 per cent of all dealers who supply the retail trade sell Mobiloil. Its marine lubricants are sold in more than 300 ports of the world.

In the past few years the company has made substantial progress in the marketing of motor fuel in the United States. This course was adopted primarily to safeguard the outlets for the motor oil in the face of the increasing growth of chains of stations owned by gasoline companies. The company's experience abroad with gasoline, however, enabled it to make surprising progress in gaining in the United States rapid public recognition for its refined oil products.

In spite of its rapid growth, the Vacuum Oil Company remains essentially a conservative company, taking each step with care and avoiding scrupulously any course which verges on the sensational. Its advertising claims, for example, are scrutinized by manufacturing experts and by its engineering staff before any claim on behalf of the products is permitted to appear in print. Each of its directors is the working head of an important part of the company's activities. The foreign marketers of its products adhere closely to the policies of the New York company, and are invited to send their key men to New York for training in the courses of instruction which are conducted by Vacuum technical and merchandising experts. Its research work has led to the preparation of numerous treatises on lubrication, which are accepted throughout the industrial world as authoritative and unbiased. Often they are used as textbooks in many colleges and universities.

At present the Vacuum Oil Company and the Standard Oil Company of New York are planning a merger which would increase, it is believed, the effectiveness of each company in meeting the conditions of present day merchandising, for although the two companies would continue business under their separate corporate names, maintaining their existing organizations, personnel, manufacturing plants and trade mark specialties, the resources of each, particularly in crudes, would, of course, be available to both organizations.

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Irak, *(Continued from page 380)*

C. should have definitely located its concessions by April 1, 1929, and this has not been done. Feisal is being urged that in view of the availability of means for beginning oil production it is to the interest of his government to grant further concessions at once.

In any case the visit of Feisal to Europe will give London occasion for considering to what extent it will have to intervene politically in the struggle between the B. O. D. and I. P. C.

The main problem of Iraq oil is one of transport. For a long time two projects have been under consideration. The French and American groups, that have each a 23¾ per cent interest in I. P. C. propose a direct pipe line through the desert to Tripoli in French Syria. The English prefer a roundabout pipe line 1500 kilometers long to Haifa in Palestine, which is under British control. The Zionists are also making a vigorous propaganda in favor of the new port of Haifa, but the recent pipe line report from Palestine is premature.

The English have only a 47½ per cent interest in I. P. C. and hence they lack majority control, but they are exerting all sorts of pressure on the French and American interests and are making one new proposition after another. Whether the Wemyss group is better capitalized and in a position to develop Iraq oil more quickly and in a more efficient way than the I. P. C. appears highly doubtful. The German interests do not regard the matter as having come to a head, but are inclined to look on the whole Wemyss plan as what Americans call a pipe dream.—[A complete review of the Iraq situation was published in the February issue of WORLD PETROLEUM—EDITOR.]

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American oil interests says the *New York Times* of August 26; have a large stake in the petroleum properties of the Kingdom of Iraq and executives were keenly interested last week in a dispatch from London reporting that King Feisal was seeking to break the monopoly held by the Iraq Petroleum Company. Five American companies—the Standard of New Jersey, the Standard of New York, the Pan American Petroleum and Transport, the Atlantic Refining and the Gulf Oil Corporation—have together substantially a one-fourth interest in the Iraq company, while the remainder is held by European oil interests, with the exception of a 5 per cent block owned by C. S. Gulbenkian, an Armenian capitalist, who originally obtained the concession.

Experimentation with Bituminous Sands

Preliminary Tests Limited To Road Building Material, With Possibilities of Yielding 40 Percent Gasoline When Cracked. Very Amenable To Hydrogenation. . By Dr. K. A. Clark

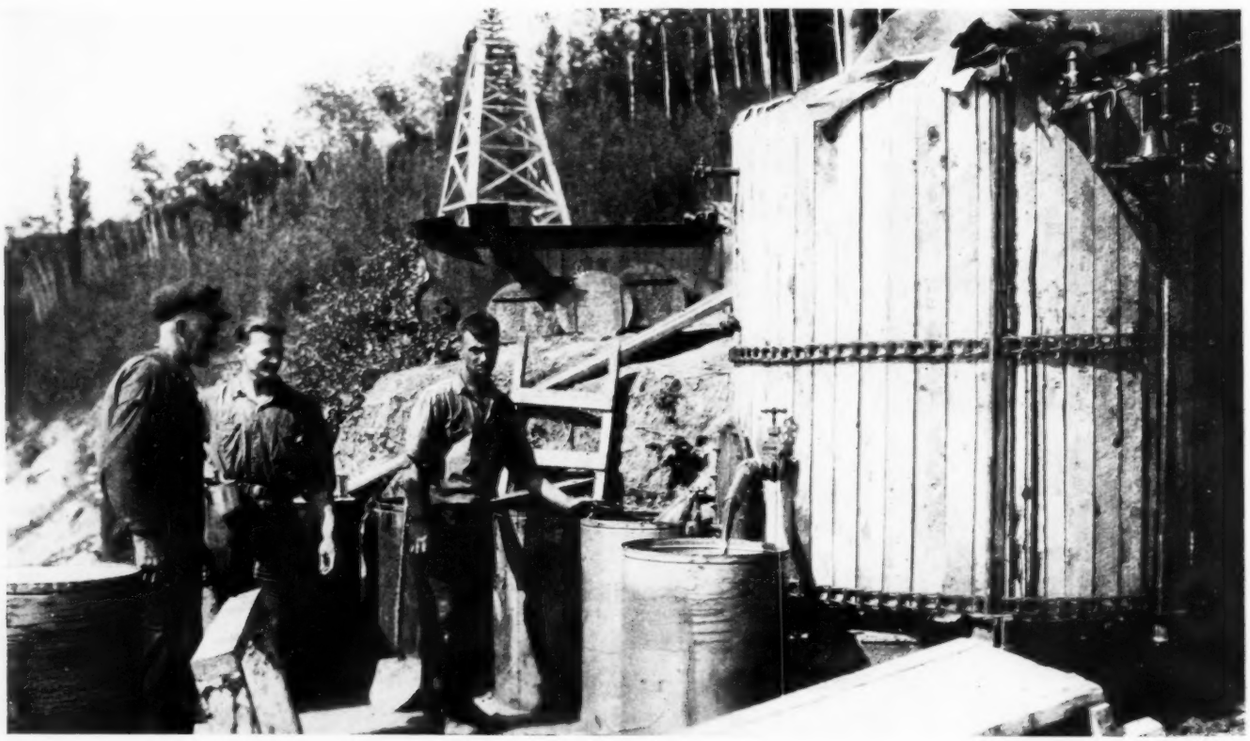
Research Engineer for the Research Council of Alberta.

EDITORIAL FOREWORD. In the April issue of WORLD PETROLEUM there was an account of the bituminous sands of northern Alberta, Canada, by W. P. Hinton. The author pointed out that, according to the estimates of prominent engineers and petroleum technologists, this field contains possibilities of producing over 35-billion barrels of gasoline, or sufficient to supply the present world demand for more than a century. In the accompanying paper, Dr. K. A. Clark, research engineer for the Research Council of Alberta, tells of the experimental work and the movement toward commercial development now being carried on.

AMONG the activities of the season, in the north of the Canadian prairie provinces, that are attracting public interest, are the bituminous sand experiments being conducted jointly by the Federal and provincial governments. The Mines Branch of the Federal Department of Mines is developing a quarry in the bituminous sand beds on the Clearwater river near Waterways, the terminus of the railway into the Athabaska section of Northern Alberta. The Research Council of Alberta has erected and is operating alongside the quarry a semi-commercial sized plant for separating the bitumen from the sands. The bitumen produced by the separation plant is being shipped to Edmonton for demonstrational road building by the Mines Branch, and to be available for studies of utilization in general.

The quarry has been opened in bituminous sand occurring as a bench along the river bank. There is a depth of about thirty feet of sand above the level of the river. The sand is being excavated by first loosening by blasting and then loading by hand work into skips which are hoisted to a cableway and conveyed to the separation plant storage platform to be dumped. This method of excavation is inherently expensive, but convenient for the first stage of investigation of mining methods. A good opening is being made into the body of the bituminous sand deposit and opportunity created for observing the physical properties and variations of the fresh beds.

Heretofore observations have been confined to the weathered surfaces of exposures which are often quite hard and tough. The quarry shows that there



Bitumen flowing from the separators into barrels for shipment.

is a decided change in the physical properties of the bituminous sand as the zone of weathering is passed and the fresh beds are encountered. The material loses its toughness, due to the presence of water in the sand, and although the material is very compact, it nevertheless has a friable nature. It would appear that some of the well-known types of excavating machinery could be adapted to the handling of the fresh sand beds and economical mining secured.

The separation plant operates on the hot water separation principle. The bituminous sand, after a preliminary heating and mixing with dilute water-glass solution, is swept into a large body of hot water by a circulating hot water stream. The separation takes place instantaneously upon the meeting of the feed of treated sand and the hot water stream. The bituminous sand disperses into clean sand and finely divided bitumen. The sand sinks into the body of hot water and the bitumen rises to the surface as a buoyant froth. The sand is removed from the circulating hot water stream by settling cones. The bitumen froth is skimmed from the surface of the water.

The crude separated bitumen contains water and sand. The large sand particles are removed by passing the crude bitumen continuously through a settling tank. The overflow from this tank runs into an evaporator where the water is driven off by heat. The dry bitumen is then held at a temperature of about 25 degs. Centigrade in a final settling tank where all but fine clay sinks from it. If salt brine is used instead of plain water as the separating medium, most of the water content of the crude bitumen settles in the first settling tank and much less evaporation of water is required. Salt occurs in the limestone underlying the bituminous sand. Consequently salt brine could be obtained cheaply for commercial bituminous sand operations.

A laboratory has been set up at the plant and equipped to make analyses of bituminous sand and of the separated bitumen at the various stages of the process. Provision has been made for measuring the quantity of bituminous sand passing through the plant. The heating throughout the plant is done by steam coils and jackets and the steam condensed in these is being measured. Consequently, the plant besides providing a quantity of separated bitumen, is also producing data upon which estimate of ultimate commercial costs can be made.

The separation plant handles from

Quarry with separation plant above.

two-and-a-half to three tons of bituminous sand per hour. The sand from the quarry supplying the plant contains from twelve to fourteen per cent of bitumen. A ninety per cent recovery of bitumen is being secured. The final product contains a few tenths of one per cent of water, and about one per cent of very fine silty or clayey mineral water.

The practical application for bituminous sand and the separated bitumen that has been given the most attention so far is their use as a road building material. The Mines Branch demonstrated, a number of years ago, that the crude bituminous sand could be compounded into successful pavement. A small paving business is being conducted by a commercial organization along this line at the present time. The Research Council of Alberta has given some study to the use of separated bitumen for the building of rural roads. This line of work is being followed up more intensively now by the Mines Branch. It has constructed a carefully designed mixing plant for combining either crude bituminous sand or separated bitumen with mineral aggregate, and the output of the separation plant is being shipped to Edmonton where it will be used for demonstrational road work.

The most appealing application for separated bitumen, and which promises the best future for bituminous sand development, is its use as a crude oil for the manufacture of gasoline. The bitumen as it occurs in the sands has no gasoline content. It is of the nature of a semi-fluid asphalt; but it is a rather reactive asphalt. It decomposes readily with heat and cracking tests that have been made on it show good results. The Universal Oil Products Co. has reported that it will yield about forty percent of motor spirit when cracked completely. Much the same result was obtained by the Kansas City Testing Laboratory. Hydrogenation tests have been made on it both in England and in Germany and the reports are that the bitumen takes up hydrogen in a rather remarkable way and is very amenable to the hydrogenation process. This report has been confirmed by Dr. E. H. Boomer at the University of Alberta, who is studying the high pressure reactions of the material. Dr. Boomer is getting encouraging results by heating the bitumen under a high pressure of natural gas.

Western Canada is in a rather different position in regard to oil supplies than most other sections of the continent. The demand for gasoline on the prairies is increasing very rapidly and has already provided a large market. So far no commercial oil fields have been found except, of course, the naphtha producing gas field of Turner Valley. For crude oil, Western Canada is dependent on imports from the Rocky Mountain field by long rail haul. Increased prices or curtailment of supply of imported crude will enhance the importance of domestic sources of petroleum products. The discovery of commercial oil pools would be the best solution of the situation. If these are not forthcoming, however, there remains the great bituminous sand deposit of Northern Alberta. Interest in the deposit from the standpoint of gasoline supply is growing. A Canadian and an American syndicate have recently negotiated with the government for bituminous sand leases in return for an undertaking to establish commercial development. In the meantime studies under government auspices are going forward and the technology of the bituminous sands is being steadily advanced.

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Russian Petroleum Production To Date

Drilling, Production and Refining Attained During First Eight Months of Fiscal Year, and Construction Program Authorized for 1930-31

. . . ***(Official.)***

SUCCESSFUL completion of the U. S. S. R. five-year production plan will have a decided effect on the European petroleum market situation, and may cause some readjustment of world-wide production and refining operations. Consumption cannot increase rapidly enough to absorb the excess from the total Russian output of 294,000,000 bbl. which the Soviet officials are striving to attain. International oil companies who foresee the importance of the impending competition can keep posted from the official figures on progress made, which WORLD PETROLEUM will publish monthly commencing with the last issue, in addition to independent reviews.—*Editor.*

As published in the August issue the oil production attainments of Soviet Russia for the first half of the fiscal year 1929/30 were far behind the schedule. Beginning with April last a general improvement was shown with the result that production for the month amounted to 103 per cent of the program, and almost the same standard was maintained during May, namely, 102.8 per cent.

During the first eight months of the fiscal year—October 1st, 1929 to May 31st, 1930—the schedule has been attained 99.6 per cent in production and 100.8 per cent in refining. Drilling reached 95.6 per cent, but exploration drilling was not so successful, attaining only 84.8 per cent of the program. In ratio to the schedule for the complete year actual realization for the eight months is as follows:

	1928-29	1929-30
Drilling	34.9 per cent	58.8 per cent
Production	25.6 "	62.3 "
Refining	35.1 "	62.3 "

Average production per well during the eight months' period shows an increase over the entire year 1928/29, as follows:

Field	First eight months 1929/30	Previous Year
	Bbl. per well	
Baku	1,987	1,919
Grozny	9,686	7,652
Emba	891	865

Construction Program

The following construction projects were approved by the Soyusneft for the year of 1930-31.

Azneft

A kerosene-lubricating oil plant of 15,400,000 bbl. of crude per year.

The paraffin base field at Surakhan, Baku, is rich in lubricating oil.

A kerosene-gasoline refinery of 35,000,000 bbl. of crude oil capacity.

A cracking plant of 42,750,000 bbl. capacity, with a pipe still for the secondary refining of the pressure distillate and for treating the same.

Extension of the existing bright-stock plant up to 560,000 bbl. capacity with an addition of three pipe stills of 3,080,000 bbl. each for deep infraction.

Conversion of the existing kerosene-lubricating oil Badger installation into a refinery for 8,820,000 bbl. of crude oil capacity through the addition of two vacuum stills.

Grozneft

A kerosene-gasoline plant (at Krasnodar) for 3,080,000 bbl. of Maikop crude oil, with secondary distillation of gasoline for the manufacture of special gasoline blends.

A kerosene-gasoline refinery at Grozny for 26,250,000 bbl. crude oil capacity.

A cracking plant to handle 40,250,000 bbl. of oil, with pipe stills for the secondary refining and treating of the products.

A paraffin treating plant for up to 140,000 bbl., and extension of the existing paraffin plant to a capacity of 140,000 bbl. of paraffin per year.

A pipeline from Grozni, Ukrania (presumably for gasoline and for tractor fuel).

Embaneft

A pipe line from Novobogatinsk to Gouryev.

Grozneft

An electric power-plant at Shiransk.

Sakhalinneft

An electric power-plant and a refinery at Okha.

A barrel plant at Stalingrad.

In addition to the foregoing a series of extensions of the existing refineries of the Azneft and Grozneft are now being planned.

	PRODUCTION			REFINING			DRILLING		
Department of the Soyuzneft	Bbls.*	Percentage of plan for eight months	Percentage of plan for year	Bbls.	Percentage of plan for eight months	Percentage of plan for year	Total hole depth (1000 meters)	Percentage of plan for eight months	Percentage of plan for year
Azneft	45,815,000	97.1	62.5	37,751,000	100.8	65.3	254.4	94.2	63.4
Grozneft	27,363,000	103.6	61.9	25,200,000	99.4	59.7	79.7	100.1	63.4
Embaneft	1,340,000	111.7	71.2	1,141,000	99.6	63.1	15.4	104.7	59.1
Sakahlineft	217,000	96.9	44.3	.....	....	....	3.1	100.3	27.3
Uralneft	21,000	60.0	15.0	.....	....	....	3.7	69.2	20.3
Total	74,956,000	99.6	62.3	64,092,000	100.8	62.9	356.3	95.6	58.8

* Seven bbl. = one metric ton.

New Light On Russian Oil Progress

Second Instalment of Comments on Accomplishments of Production Fields, Refineries, Transportation and Exports, Continued From August Issue

By Basil Zavoico

Consulting Geologist, Tulsa

THOUGH of relatively minor importance elsewhere the oil transport problem in Russia is extremely difficult. The main trunk pipe lines are built exclusively for export. The Baku-Batum (510 miles) kerosene pipe line has a capacity of about 8,000,000 bbl. per year, the new Baku-Batum crude line has a maximum capacity of 12,000,000 bbl. per year, while the Grozny-Touapse (325 miles) crude line has a capacity of 8,000,000 bbl. per year. A short Grozny-Petrovsk line has a capacity of 5,000,000 bbl., thus the total present maximum pipe line capacity is about 35,000,000 bbl. per year. This capacity will not be changed much by 1932/33, because no new lines are being built now. The development of Kuban-Maikop fields will result in short lines to the Black Sea, with the increase in carrying capacity of pipe lines to about 60,000,000 bbl. by 1932/33 operating year.

Transportation Problem

The main channel of moving oil and its products from Baku and Grozny to the interior markets is via Caspian Sea and the Volga River system. The navigation is open only part of the year, the Volga being frozen during the Winter months. The following table illustrates well the insufficiency of the water transport:

Caspian Sea Transport

—1929 Navigation—		—1930 Navigation—	
Planned Bbl.	Actual Bbl.	Planned Bbl.	Maximum Bbl.
40,500,000	38,800,000	49,000,000	42,800,000

The balance of transport is accomplished by tank car shipments, primarily from Grozny to the points in Southern Russia, and also from Baku to points in Trans-Caucasus. Any large increase in railroad shipments is out of question because of the small carrying capacity of tank cars, and the disorganization of Russian railroad system which delays the return of empty cars indefinitely.

Summing up the transport capacity, with probable increases by 1932/33, the following maximum figures are arrived at:

Grozny—Touapse Pipe Line	10,000,000 bbl.
Baku—Batum Pipe Lines (granting completion of third line)	30,000,000 bbl.
Maikop—Black Sea Lines	30,000,000 bbl.
Caspian Sea—Volga (absolute maximum)	100,000,000 bbl.

Even if the railroads will move as much as 20,000,000 bbl. in that year the maximum total will still be within 200,000,000 bbl., and therefore the planned production of 294,000,000 bbl. appears entirely too high as checked against transport facilities.

In reality, however, more reasonable total transport figures by 1932/33 will not exceed 175,000,000 bbl., because the 100,000,000 bbl. figure for Caspian Sea fleet movements is admittedly exaggerated, also the third line from Baku to Batum is not yet authorized.

Interior Market

The Soviet Planning Agencies for several years were tempted to use American figures for the rate in increase of home consumption of kerosene, gasoline and fuel-oil, entirely disregarding the fact that U. S. A. has been under normal conditions, while Russia is entering a reconstruction period. Instead of figuring on normal rate of increase of about 12 per cent, the statisticians would be better justified to double the home demand each year, provided the economic life of the country is improving as fast as it is reported to be, or at least to allow for a 33 per cent increase, which datum appears now to be more nearly correct.

The original anticipations of 10 to 15 per cent increases therefore fell far short of actuality. The stocks prepared proved to be far from sufficient. During 1928/29 operating year the situation was somewhat remedied by decreasing the quality of domestic kerosene, thus increasing its quantity; but, even such dilution was not sufficient and the exports were curtailed.

At this time the home demand is increasing at a rate which will exclude the possibility of exporting certain products in the next very few years, gasoline and lubricating oil being not affected. Figures available for the first five months of 1929/30 operating year indicate a 28.7 per cent rate of increase in consumption of all petroleum products in the home markets, and in detail—a 31.3 per cent increase in consumption of heavy oils, 20.4 per cent increase in consumption of kerosene and 41.0 per cent increase in demand for gasoline.

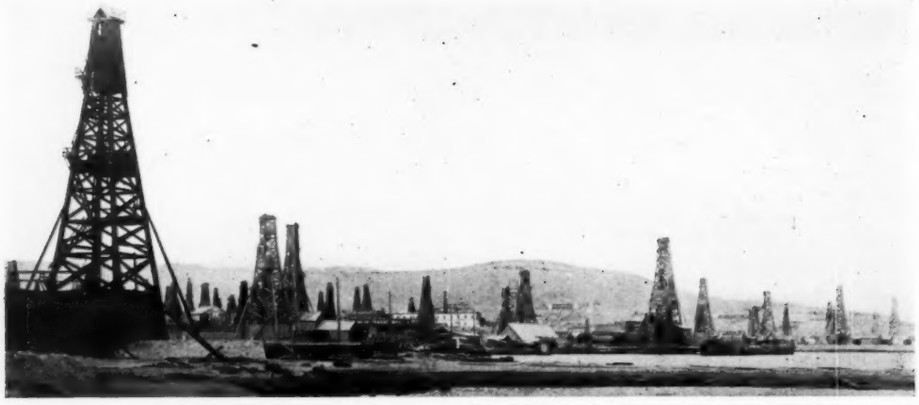
Kerosene Quality Must Be Improved

The situation is made more serious by the fact that the quality of kerosene cannot be reduced, but must be improved due to its use in tractors. Also because large additions of new tractors are due immediately, the consumption of tractor kerosene may be expected to increase very rapidly. By 1932/33 the home markets may require most of the kerosene manufactured. The rate of increase in gasoline consumption is indicative of what may be expected in the near future. Although only 1,300,000 bbl. of gasoline will be consumed during the current year, the 1932/33 operating year should see the consumption increased to 10,000,000 bbl. or over, provided trucks, light automobiles and gasoline tractors will be introduced at the rate anticipated today.

Increased Heavy-Oil Consumption

If the heavy oils are consumed in the interior now at the rate of 48,000,000 bbl. per year, and the rate of increase is 31.3 per cent per year, then the 1932/33 op-

Drilling in part of the Baku oil field resembles Lake Maracaibo, Venezuela.



Section of the Baku oil field.

erating year demand will reach 110,000,000 bbl., especially since it is planned to industrialize the country very rapidly, with all plants and railroads requiring fuel oil in preference to coal.

Summing up the home markets, the anticipated rate of increase should hold at about 30 per cent for all petroleum products until 1932/33, which will mean a total consumption in the neighborhood of 160,000,000 bbl., and should leave in that year free and available for export at seaports about 20,000,000 bbl. of gasoline, 20,000,000 bbl. of heavy oils and a corresponding amount of lubricating oils. The amount of kerosene available for export should not be large, unless the Government will prefer to export, and thus reduce forcibly the home consumption.

Exports

The export of petroleum products from Soviet Russia increased at the rate of 38.0 per cent per year during the first half of the current year. The table showing actual exports during the first half of 1929/30 operating year follows:

	Bbl.	Percent of total exports %	Rate of increase %
Gasoline	4,880,000	26.0	28.0
Kerosene	3,400,000	20.0	13.0
Heavy Oils....	7,640,000	48.5	67.0
Lub. Oils.....	820,000	5.5	3.5

The above figures are self-explanatory. The kerosene home consumption forces relative reduction of kerosene exports, while gasoline manufacture falls far short of the possible sales. The rate of increase in gasoline exports is interestingly enough coincident with the rate of increase in consumption of gasoline in Germany in 1929, as compared with 1928, though being ahead of the rate of increase in consumption in France—18.0 per cent, and in Italy, 15 per cent.

The Soviet leaders reviewing the export tables must realize their tremendous losses in disposing of large amount of heavy oils, which contain so much valuable gasoline, and hence their desire to complete as much cracking capacity as it is possible within the next few years. At this time the large export of heavy oils may be considered as forced by the financial status of the Soviet Treasury.

A most interesting development in Europe is the tendency to build refineries near centers of consumption, and the introduction of cracking stills in combination with hydrogenation process cannot but help accentuate this tendency, thus increasing crude oil demand, at the expense of gasoline. If the construction of these refineries will proceed at an unwarranted rate, then the demand for crude oil will eventually force increase in its price, and the advantages gained will not be as great as indicated now. However, a few refineries near large consumption centers of Europe should prove extremely profitable, and in connection with short feeded gasoline pipe lines they may revolutionize the European gasoline supply problem.

Exports Will Increase

In general conclusion it may be stated that the Soviet exports will continue to increase, especially those of gasoline, though the increases will be approximately in line with increased consumption in Europe, and accordingly Russia will retain its present share of the market rather than add new markets.

Financially the Soviets are in more favorable position in regard to production costs (*), since because of the socialistic control system, all exports may be considered as net profit in foreign currency, and in practice selling gasoline at 1c per gallon, may mean to Soviet exactly that much profit. However, it is not likely that Soviet will engage in trade wars, but will be rather desirous of entering into agreements to maintain existing prices, thus obtaining maximum revenue for purchases of manufactured goods outside of Russia. The peaceful entrance of Soviet products into European countries, as well as into U. S. A., is of paramount importance to Soviet Union, because the international relations between capitalistic countries and a communistic one are naturally very delicate, and any unfriendly gesture like wholesale underselling at distress prices, may and will cause complete exclusion of Soviet products from countries of import, thus leaving the Soviet Russia with unusuable huge surplus of gasoline, as well as a large number of other products.

The following additional information has been received since the first instalment of this article was published in August.

1. In the Maikop field of the Kuban District a well drilled to 2,720 ft. uncovered a deeper pay sand, producing 15,000 bbl. initial, thus further proving the potentiality of the Maikop.

2. In the Bibi Eibat field of Baku District well No. 132 penetrated the XVI-th sand horizon at 3,540 ft. and before sanding up produced about 150,000 bbl. in three days, flowing wild. This well appears to be located in the faulted zone area, thus explaining the huge production, as the first two wells drilled to XVI-th horizon were not as spectacular.

3. The Oural district continued without any new favorable developments.

(*) Actual costs are very high. Azneft Trust alone employed steadily 52,000 men in May, 1930.

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Transporting Oil at 18 Knots

ON her maiden voyage from Hong Kong to New York, via the Panama Canal, the new Japanese passenger motorship *Kinai Maru* carried 1,000 tons of wood oil as cargo, which was loaded at a Chinese port. She has four deep tanks for the purpose, as will five sister ships under construction. Her average speed is 18 knots. Her Sulzer Diesel engines aggregate 11,000 s.hp. Her scheduled time between New York and Hong Kong, via Japanese ports, is 43 days. Her owners are the Osaka Shosen Kaisha Line.

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Belgian Oil Duties

BELGIUM has reduced the import duties on gasoline, kerosene, lubricating oil, and fuel oil. At the same time an excise tax has been imposed on all gasoline refined in Belgium.

Surface Orientation for Hole Surveying

Demonstration of the Case for Accuracy in Oil Well Bore Hole Surveying Published in Abstract With Acknowledgments to the A. A. P. G.

By R. P. McLaughlin

SURVEYING the underground course of oil wells is a practice which has demonstrated its utility and will doubtless come into more widespread use. There has been manifest a certain timidity on the part of oil operators to survey their wells due to possible legal complications involving the question of ownership of underground deposits beneath various tracts of land. This obstacle is probably not so important as it might at first appear. The oil industry is one of the most progressive and can be depended upon to solve satisfactorily such problems as soon as they are fairly confronted and studied. A recent instance illustrating such ability is the subject of unit operation of oil deposits which was not more than five years ago unanimously condemned. Now a majority of the most influential organizations in the industry are endeavoring to perfect the plan and put it into wider use.

Since the drilling of deep wells has become necessary their cost has mounted rapidly, and the large investments in such work demand consideration of all pertinent facts and conditions. The legendary policy of the ostrich hiding its own head and thereby imagining that its entire body is protected has no counterpart in the mental processes of the progressive oil operator. Success in the oil business has followed ability to face facts, whether pleasing or not, and then to adjust operations in accordance with the demonstrated conditions.

It has been only a comparatively short time since investigations demonstrated the lamentable and widespread results arising from failure to drill wells vertically. In this short period there has been such a remarkable advance in drilling operations that extremely crooked holes are now less frequently drilled. In order to drill wells vertically it is necessary to spend more time and money than before, and there is doubtless an economic limit which it will be found unnecessary to exceed. The determination of the economic limit for straight drilling, in addition to the need for complete information as to underground conditions in order to direct various new production and conservation methods will stimulate bore hole surveying.

Any survey, whether on the surface or underground, must yield data from which both a plan and vertical cross-sections can be drawn, if the survey is to be considered as complete. The mere determination of vertical angles along the course of an oil well, as it is done with the very useful acid bottle, does not constitute a complete survey. In addition to measuring inclination, it is also necessary to determine the horizontal components of the various sections of the hole, or in other words, to determine its direction or orientation.

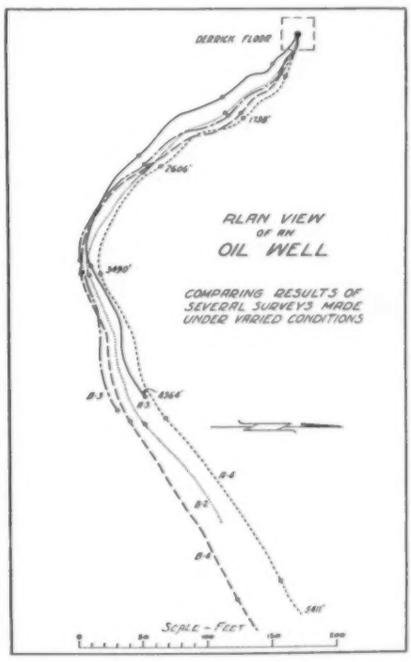
In all of the various surveying methods orientation, which is equivalent to the measurement of angles in horizontal planes, is accomplished in two ways. One method involves the use of an instrument containing some part of compass to indicate the direction towards which the instrument is inclined. The compass may be of either the magnetic or gyroscopic type. The second method involves the use of an instrument inserted into the hole by means of tubing to which it is rigidly attached, and the direction of inclination of the instrument is determined by observing the degree of rotation of the portion of pipe projecting above the ground surface.

Surveying equipment developed for oil field use and depending upon surface orientation makes use of the ordinary tubing or drill pipe with which all wells are regularly equipped. The instruments are light and compact and their handling involves nothing but the routine procedure common to inserting either tools or pumps in wells. Some instruments are of simple construction and their operation is but little more difficult than that of an ordinary surveyor's transit. Of course the operator should have as much technical training as is required to conduct ordinary surveying and mapping operations.

Widely discrepant results have been reported from the attempts to survey oil wells, and the accuracy of the various processes has been frequently questioned. It is impossible to state whether or not a particular survey was accurate or otherwise unless it is known exactly what procedure was followed. Recently published popular descriptions of some instruments indicate that they have been designed without knowledge of the limitations imposed by nature. By the same token it is probable that some attempts at surveying have been made without sufficient regard to the physical and mathematical laws which govern such matters.

The writer has heard numerous discussions bearing on the impossibility of accurate surveys at great depth where surface orientation is depended upon. Many of the arguments advanced have been both ingenious and stimulating, but as a basis for technical discussion they have lacked the support of results obtained by actual tests. Furthermore, the rigid and straightforward process of reasoning requisite to consideration of a

Fig. 1



problem in analytical mechanics has usually been absent. Imagination has too frequently been relied upon in place of observed facts. Therefore, until theoretical discussion is placed upon a more substantial foundation it seems scarcely necessary to depart from the consideration of observed conditions.

During the past year the writer has had occasion to survey a great many oil wells ranging in depth from 4,000 ft. to more than 8,000 ft. All of this work has been performed for other parties and the results were therefore confidential and not available for publication. An opportunity was recently presented, however, through the co-operation of one of the large oil companies operating in

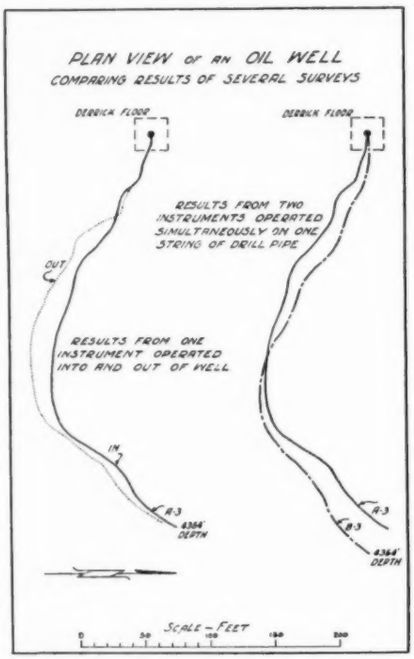


Fig. 2

California, whereby numerous surveys could be made for the prime purpose of comparing several methods and determining their degree of accuracy. Permission to use certain data has also been obtained from several other oil companies. Where a continuously recording instrument is used it is possible to make a duplicate or checked survey without the expenditure of much additional time, by simply taking the results obtained while the instrument is being withdrawn from the well in addition to those obtained while the instrument is being run into the well. With such an instrument it is also possible to perform various experiments to determine what is happening underground during the course of a survey.

In making the series of test surveys above mentioned a well was chosen where repeated surveys had already been made during the process of drilling. It was decided to use two different strings of drill pipe, two instruments of radically different construction and also several methods of measuring rotation or orientation. The instruments were used simultaneously, that is, one was mounted directly below the other and rigidly attached to the lower extremity of the drill pipe. Readings by the instruments were made after each additional stand of pipe (averaging 88 ft. in length) was inserted in the well. Some of the surveys were made to a depth greater than 6,000 ft.

The inclination of the well from vertical was found to be a variable quantity and did not conform to a smooth curve. A drawing showing the full vertical section is too large for reproduction. A fair idea of the general downward course of the well is afforded by the following tabulated statement:

Depth (ft.)	Inclination from vertical (degrees)
300	0° 50′
600	3° 50′
900	3° 0′
1200	1° 50′
1500	3° 20′
1800	7° 0′
2100	2° 40′
2400	4° 20′
2700	3° 30′
3000	6° 10′
3300	5° 50′
3600	8° 30′
3900	9° 0′
4200	7° 20′
4500	10° 0′
4800	10° 40′
5100	9° 25′
5400	10° 40′

The final result of all the tests is shown by Figure 1, which is in general self explanatory. The letter A denotes results obtained by one instrument while B denotes the results obtained by the other instrument. The number accompanying each letter denotes the particular test (for instance A-3 denotes the results obtained by the first instrument during test number three). The results of test number one are omitted because it went only a very shallow depth and disclosed but little of importance.

A description of the instruments is not necessary at this time except to state that both had been extensively used and were of radically different construction. One made a continuous record on a strip of paper while the other made an intermittent record upon photographic film.

Test number two used drill pipe having 5½ in. outside diameter and carrying an instrument container 7⅝ in. diameter. Test number three used drill pipe of 4½ in. outside diameter and carried an instrument container 5 in. diameter. Test number four used drill pipe ½ in. diameter with a 5 in. instrument case. The inside diameter of the well casing was 7¾ in.

The variety of drill pipes used and the variation in the size of the instrument case gave opportunity to observe differences which might arise from the action of the pipe due to such causes as friction and elasticity. The use of two instruments operating simultaneously and under identical conditions demonstrated the amount of divergence due entirely to instrumental inaccuracies. Separate measurements of rotation of the drill pipe gave a basis for comparison of such methods.

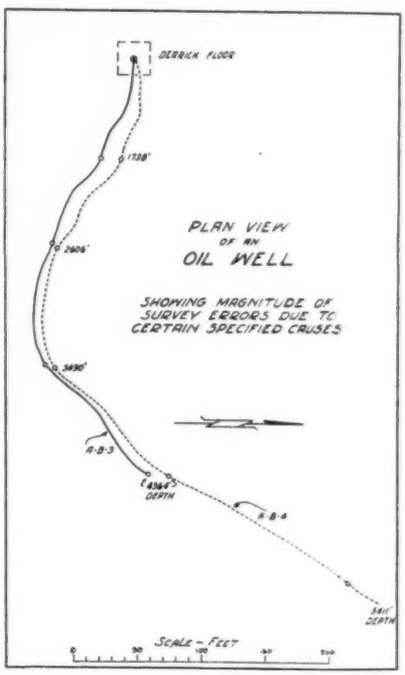


Fig. 3

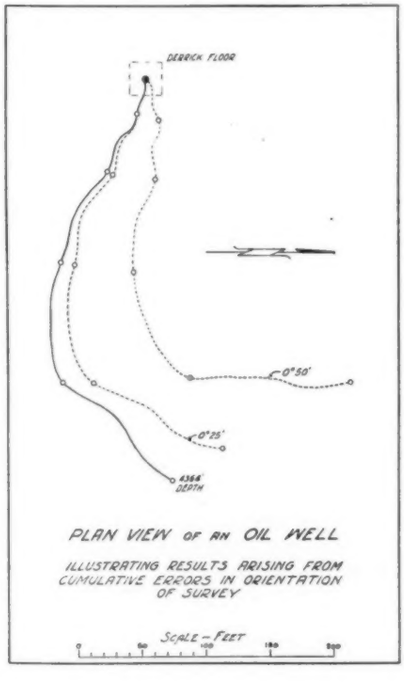
The possible source of errors in surveying bore holes by means of orientation from the surface are three in number, namely, instrumental inaccuracy, measurement of orientation, and erratic behavior of pipe. The above mentioned test was therefore conducted in such a manner as to appraise fairly the magnitude of error arising from each of one or all the sources which can affect the final result.

Instrumental inaccuracy must be reckoned with in all methods of surveying. It would be difficult if not impossible to economically construct an instrument, small enough to insert in a bore hole, yet which would be entirely

free from error. However, it is possible to reduce the error within narrow limits and it is furthermore quite feasible to design an instrument which can be operated so as to neutralize the effect of its inaccuracy. The magnitude of discrepancy due entirely to instrumental inaccuracy is shown on fig. 1 by comparison of lines A4 and B4, which are produced under conditions identical in all respects except the action of the instruments. Comparison of lines A3 and B3 also measures the limit of instrumental inaccuracy and this pair of lines is separately shown on fig. 2 in order to give a clearer view of them. segregating instrumental errors from the total error a median or average line may be drawn between lines A4 and B4. This median line approximately contains only errors arising from the other two possible sources, namely, rotation measurement and behavior of the pipe. A similar median between lines A3 and B3 serves for the same purpose. Fig. 3 shows the two median lines developed from tests numbered three and four and indicates the limits of error arising from inaccurate measurement of orientation and plus any effect of erratic behavior of the drill pipe.

Consideration of the magnitude of errors arising from inaccurate measurement of pipe rotation is a wide subject, lying entirely within the scope of general surveying above the ground surface. The subject is adequatly covered by many text books and need not be dealt with in this paper further than to state that it is simply a problem of accurately measuring angles in a horizontal plane. Probably the most accurate measurement of horizontal angles is that made in geodetic surveying where a triangulation network is being established at the expenditure of almost unlimited time. In view of the narrow margin to which we have reduced errors, as shown by fig. 3, it is sufficient to state that the measurements of rotation made during the present tests were recognized as being not absolutely accurate. However, all the results here presented are on a uniform basis and are reasonably accurate. While an oil well is being surveyed all of its drilling or producing operations are at a standstill and therefore time must be economized by sacrificing absolute precision. The map on fig. 5 suggests the comparatively narrow limits to which compensating errors in orientation may extend. Fig. 4 is presented to illustrate the very great errors which will follow the introduction of constant errors each of apparently insignificantly small dimensions, but repeated at each observation and always in the same direction.

Fig. 4



In concluding the discussion of errors in measuring orientation it may be said that the methods used during the series of tests, and also in common practice are sufficiently inaccurate to fully cover all the divergence shown on fig. 3 without searching for possible errors due to erratic behavior of the pipe.

Accuracy in determining vertical distances depends upon tape line measurement of the drill pipe together with instrumental measurement of vertical angles. The subject demands only brief mention because correct results are readily obtained. There was a variation of less than one foot vertically between results of the two deepest surveys shown in fig. 1.

Although the previously outlined tests indicate that the drill pipe or tubing upon which an instrument is being operated, is not the source of appreciable error, it is possible to present other more direct evidence to substantiate this conclusion.

In order to determine the effect of friction between the drill pipe and well casing, tests were made to determine how much twist could be put into the drill pipe. At test number three with $5\frac{1}{2}$ in. drill pipe, at a depth of 4,364 ft., the pipe was turned and the rotation measured both at the top and bottom of the string of pipe. When the instrument was first landed at the given depth

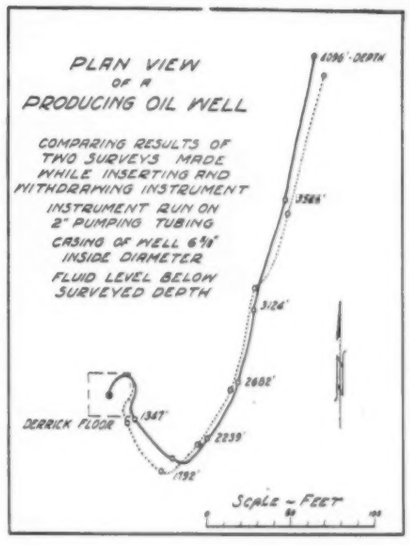


Fig. 5

it was allowed ample time to record its position, and then the rotary table on the derrick floor was turned almost half way round (161 deg. to be exact), and the instrument was again allowed time to record its position. Next the pipe was lifted through the length one stand of pipe (88 ft.) and again lowered to the given depth and time allowed for instrumental recording. The raising and lowering of the pipe was repeated several times. Comparison of measurements made at the derrick floor and at the instrument showed that when the pipe was first turned, without being raised and lowered, the instrument at the bottom turned only 137 degs. while the top of the pipe turned 161 degs. In other words, a twist amounting to 24 degs. was put in the pipe. After the pipe was raised and lowered once the instrument showed that it had turned through the same angle as had the top of the pipe. In other words, the raising and lowering of the pipe had entirely freed it of twist. Each of the subsequent raising and lowering operations showed the same amount of rotation at both the top and bottom of the pipe.

This test of rotation at the top and bottom of the pipe had previously been noted many times by the writer where check surveys were made with a continuous recording instrument while it was being run into a well and while it was being withdrawn. Fig. 2 shows the record of a check or round trip survey made during test number three. This round trip record represents ordinary practice during the course of routine surveying operations, and it

alone affords a basis of comparison almost as satisfactory and convincing as that produced by the more elaborate series of tests.

An example of the results obtained by a duplicate or round trip survey is shown by fig. 5. The survey went to a depth of 4,096 ft. and involved forty-six observations or readings, each way. The horizontal deflection was 235 ft. The vertical angles increased with considerable regularity from zero at the surface to 11½ degs. at bottom. While being withdrawn from the well the surveying instrument successfuly occupied each of the various stations at which it had made its record while entering the well. It was therefore possible to make forty-six comparisons of rotation of the pipe both at its upper and lower ends. The pipe used was 2 in. pump tubing, which is much more flexible than drill pipe is. The pipe was, for convenience of measuring rotation, frequently turned at the derrick floor and as a consequence the datum side of the instrument faced approximately in the same direction at each station. In other words, the instrument when reaching a certain depth coming out faced within about 45 degs. of the direction it had previously faced at the same depth when descending. During its whole downward course the instrument made two complete revolutions horizontally and did approximately the same while coming up. A comparison of all these readings showed identical action at both top and bottom of the pipe, with only such discrepancy as would be due to instrumental inaccuracy. The degree of coincidence of the two series of observations is shown by the two courses plotted in fig. 5. The data were also compared in other ways and similar results obtained.

Another example of evidence furnished by a duplicated or round trip survey is worth mentioning because physical conditions were considerably different although the outcome was the same. A drilling well was surveyed to a depth of about 6,300 ft., using drill pipe of 3½ in. outside diameter and running in casing having 6⅝ in. diameter. The hole was approximately vertical to a depth of about 4,200 ft., the inclination from vertical being less than three degrees. Within this distance the hole, as disclosed by a plan view, described a complete loop or spiral having a diameter of approximately 40 ft., and then struck off in a comparatively constant direction. The portion of the well below 3,200 ft., where the direction of its course was rather uniform, had a peculiar vertical profile, first flattening out to a vertical angle of about 14 degs., then straightened up again until the inclination was only about 3 degs. While going into the well the instrument turned around three times, due to the influence of the hoisting cables, and while coming out it completed four revolutions. Hence the instrument during its upward course was only once facing in the same direction that it had been while descending. Observations on the upward trip were discontinued at a depth of about 1,500 ft., making avoidable 54 duplicated readings of inclination and direction. The horizontal discrepancy between the two surveys was 16 ft. and comparison of readings, as in the preceding instance, showed identical rotation of both ends of the drill pipe.

It has been suggested that pipe would develop a twist simply by being hung up in a long string. The possibility of this has been tested and failed to develop any evidence to support the theory. If such an action did take place it would be compensated for in the course of ordinary surveying operations which put full weight on the pipe before measuring for orientation.

In conclusion it can be safely asserted that the surveying of bore holes by means of orientation from the surface is a method amply accurate to meet the needs of the petroleum industry. As a corollary it must be borne in mind that the entire operation is one involving precision, and therefore assumes adequate equipment in the hands of a thoroughly informed and competent observer.

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Mexican Petroleum Notes

VARIOUS petroleum companies which have gasoline refineries established in Mexico have petitioned the Treasury Department to increase importation levies on gasoline as a means of protecting the Mexican product. The Treasury Department has turned the case over to the Committee on Tariffs, and at an early session of this body the matter will be discussed by representatives of the petroleum companies, the Ministry of Industry, Commerce and Labor and the special taxations bureau of the Treasury Department. It is anticipated that a lively discussion will develop during the session.

Owing to the high price at which gasoline formerly was retailed in Mexico, the late General Obregon, then president, reduced importation duties and organized co-operative societies for the importation of the commodity. But the principal beneficiaries of these reduced tariffs were residents of places on the border, close to American suppliers and far from Mexican centers of production.

Those who oppose elevating gasoline importation taxes contend that such action might cause an increase in the retail prices in Mexico, especially now when much is being done to encourage the use of gasoline in place of coal for combustion. Others are of the opinion that the Mexican product will benefit if retail gasoline prices are fixed by the government at the same time that importation duties are increased, thus allowing the domestic product to compete with the foreign.

Another marked decrease in Mexican petroleum production tax revenues was noted in July, which yielded only 822,-151.39 pesos (about $411,075.69), according to official figures of the special taxations bureau of the Treasury Department. The June revenue was 930,391.56 pesos. January with a yield of 744,-154.04 pesos was the next poorest month of this year. The best month of 1930 was February which gave 1,187,744.76 pesos.

The exportation of "dry ice" (solidified carbon dioxide) on a large scale from Mexico has been started with the dispatch of 40,000 pounds by steamer to New York. The product is being manufactured near Tampico by Compañia Mexicana de Carbono, a subsidiary of the Globe Petroleum Co. Gas is obtained from the Quebrache fields in the state of Vera Cruz, about 18 miles from Tampico. The initial production is 40,000 pounds per day but there is sufficient gas, it is estimated, to afford a daily production of 4,000,000 pounds. Three freighters have been equipped for the transport of the "dry ice," so the "new" industry will probably grow to importance.

Submarine Line for Tanker Loading

Interesting Engineering Project Recently Completed in Estero Bay, California. Sixteen-inch Welded Pipe Line Laid on Sea Bottom

. . ***By C. W. Geiger***

WHAT IS believed to be the world's largest submarine oil-loading line was recently placed in operation by the Standard Oil Company of California, in Estero Bay, San Luis Obispo County, California. In order to provide an outlet for oil produced in the Kettleman Hills, the Company has constructed a ten-inch trunk pipe-line from this field to the Pacific Ocean, a distance of seventy miles. Oil from the wells is collected through field lines to a central gathering station located near Kettleman City, where it is passed through rectifiers to remove dissolved gases. Heavy-duty steam pumps, operating at a thousand pounds pressure, then force the oil through the trunk line direct to storage tanks on the Coast. There are no intervening booster stations along the line. This high-pressure direct pumping is possible because the line is constructed of seamless pipe. All of the field joints are welded—there is not a screwed fitting or joint in the entire line.

Making the line fast to one of the great anchors.

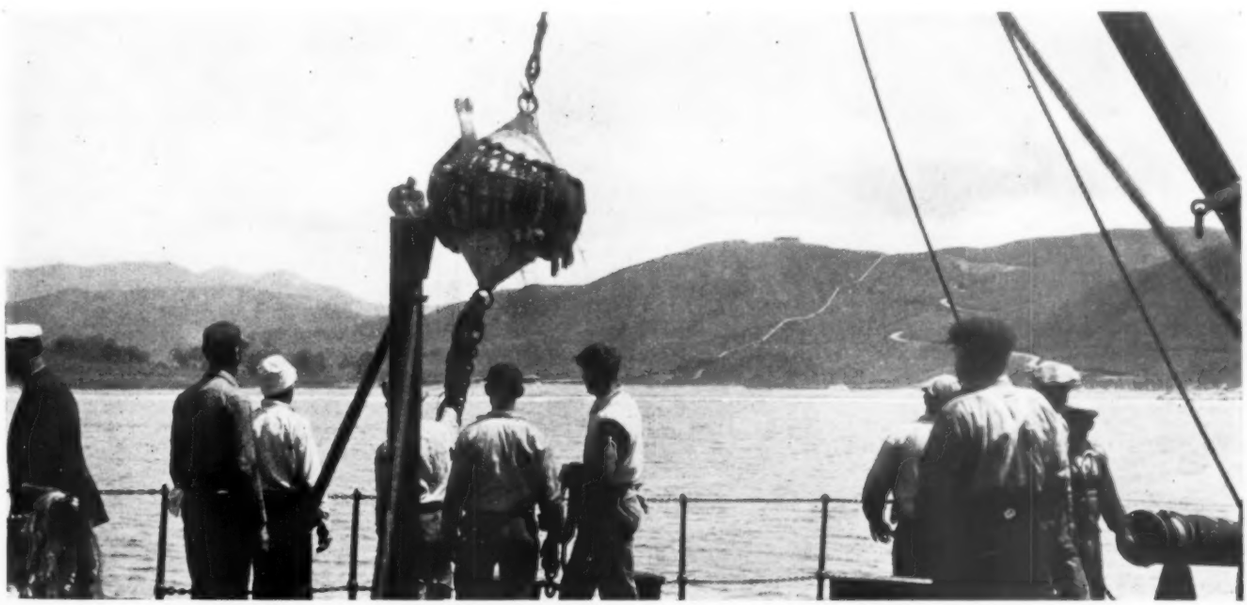
The western terminus of the line is at Estero Bay, where a station has been constructed to load the oil into tankers. The storage tanks which receive the oil from Kettleman Hills, are located about a mile from the beach.

Oil is loaded into tankers directly from the storage tanks. For this purpose, instead of building a wharf, which in the open bay would be exposed to damage by storms, the Standard Oil Company of California has constructed a submarine line that cannot be damaged by rough weather and will provide a more economical means for loading.

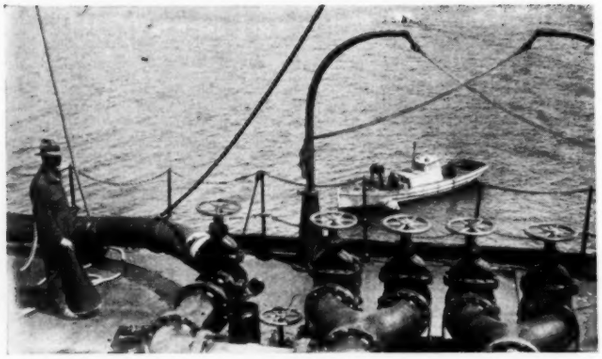
This submarine line consists of 16-inch welded steel pipe extending from the beach along the bottom of the sea to a point 3900 feet out in the ocean where the water is deep enough to provide safe anchorage for the largest tankers. The shore end of the submarine line is joined to the tanks on the hills through a 20-inch pipe. A flexible rubber hose is connected to its sea end. When not discharging, this hole will lie on the bottom; but, it is arranged so that its end can be readily picked up to the surface by tankers for loading.

A bell buoy was installed near the mooring site by special permission of the Bureau of Lighthouse Service. The sound of the bell will warn craft that they are approaching the submarine line, and also act as a guide to incoming tankers in foggy weather.

In order to provide reliable communication between the shore station and the tankers loading at this terminal, an armored telephone cable was laid from the beach to the moorings, parallel to the submarine pipe line. A flexible conductor spliced to the end of this cable is secured to a small buoy floating on the surface,



Picking up the buoyed end of the oil line. Pipe line can be seen on the extreme right.



Hose connected to the oil manifold.

on which several hundred feet of telephone wire are coiled. During loading, this wire will be passed to the deck of the tankers and attached to a portable telephone. As an additional precaution, during all loading operations, the telephone communication will be supplemented with whistle, lights and semaphore signals.

When this terminal is placed in operation, the oil will be loaded into the ship by gravity. There will be no need for pumps. The natural elevation of the tanks will permit oil to flow through the large pipe line at the rate of between 15,000 and 20,000 barrels per hour. To produce similar flow with pumps would require some 2000 horsepower. The high rates of flow provided for will enable tankers to make an extremely quick "turnaround"; only about six hours will be required to load even the largest vessels.

To insure accurate control of the oil being loaded at these high rates, a control gatehouse has been located at the foot of the hills near the beach. All the ship communication equipment will be located at this control house together with an electric flow meter which will give a continuous indication of the rate of flow. A 16-inch cast steel, motor driven valve located at the house will be used normally for adjusting the rate of flow to the ships. A similar hydraulically operated valve equipped to close quickly without setting up a dangerous surge in the pipe is also installed here for emergency shut off. The controls for these valves, together with the flow meter and all the other instruments, are centralized at a desk in the control house. Here the operator with an unobstructed view of the ship with which he will maintain continuous communication, has finger control of the oil.

The launching of the submarine line and the installation of the marine equipment were interesting operations, the entire 3000 feet of 16-inch pipe was welded together into one long tube weighing about 300,000 pounds. This was placed on low cars running on a small industrial railroad track that the contractor, the Pacific Bridge Company, had laid on the floor of the valley of Toro Creek, which slopes gently back from the edge of Estero Bay. When all was in readiness, a steel towing cable was brought ashore from the tug "Sea Salvor," anchored about 2000 feet offshore. This cable was attached to a pulling bridle secured to the end of the pipe line. A sled to guide the line over any obstacle such as rocks was also firmly lashed under the end of the pipe-line. At a given signal, the "Sea Salvor" pulled the pipe line out along the ocean bottom. When the line was in position, it was anchored with chain weights at several points along its length. It was secured on the beach by means of a heavy concrete block cast around the pipe.

Floating telephone station; the buoy supports a flexible conductor spliced to the cable paralleling the oil line.

After a hydrostatic test showed that no damage had occurred during the launching operation, a diver's crew installed the flexible hose at the sea end of the line. This hose is made of rubber, heavily reinforced with a spiral steel wrapping. A lifting bridle is connected to the end of the hose by a chain attached to a buoy which floats on the water.

Five enormous anchors, each weighing 16,000 pounds, were placed in a semicircle about the end of the submarine line to provide moorings for the tankers while loading. The tankers will not tie directly to the anchors, but will secure their mooring lines to big can-buoys attached to the mooring anchors by means of heavy forged steel chain. These moorings were designed to hold the Standard Oil Company's largest tankers in rough weather.

In planning the design and operation of this loading terminal, every possible precaution has been included to guard against the spilling of oil. The United States Army engineers, in granting a permit for the installation of the submarine line, indicated that they were satisfied with the precautions made so that no oil would be released to contaminate the beaches in the vicinity. Not only have numerous precautions been provided against spills occurring during loading, but also a set of tanks and pumps is installed near the shore end of the submarine line, into which any oily ballast or bilgewater the ship may contain when she comes into receive a cargo at this port can be discharged. All the oil will be skimmed off these tanks so that nothing but clean water is discharged into the ocean.

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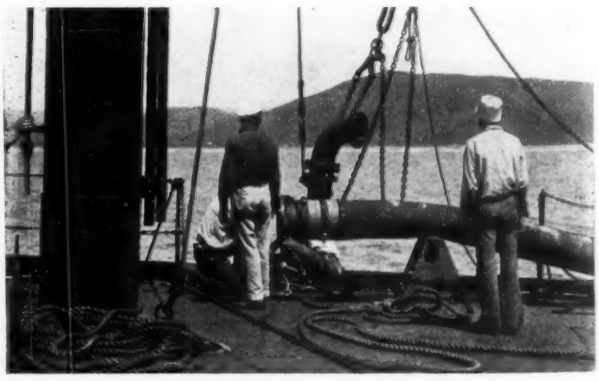
Deeper Sands in Colon Discovered

Already ranking as one of the most important oil fields in Venezuela, because of the comparatively high quality of the crude produced from this newly opened territory, the Colon district has increased in importance through the indications of a new and deeper producing horizon that has been found at Las Cruces.



Making connections to the fuel line on deck.

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Recording Pressure Gauge Model 11-M—featuring inverted penarm; rust-proof case, of dust, fume, and moisture-proof construction.

Recording Thermometer Model 240. A particularly rugged Instrument. Inverted penarm is standard, case is dust, fume and moisture-proof.

Bristol's Industrial Stem Mercury Thermometers. Available with straight or right-angle fitting. Engraved scale assures utmost accuracy. Very easy to read.

Double Service Distance Type Air Operated Temperature Controller. Furnished to control over any selected temperature range up to 550° Fahr.

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OF SPECIAL INTEREST

will be a working model of Bristol's Air Operated Cycle Controller equipment, recently developed to provide intermittent control of Oil wells. This equipment has been arranged with piping in colors to show the low, medium and high pressure air lines. This miniature operating unit should prove particularly interesting, for it opens new possibilities for automatically controlling oil well flowing conditions.

Also of interest will be the exceptionally complete line of Air Operated Temperature and Pressure Controllers, now offered as a standard part of the Bristol Instrument Line. These instruments are remarkably simple in design—featuring a unique air valve arrangement that should prove interesting to Instrument "Maintenance Men."

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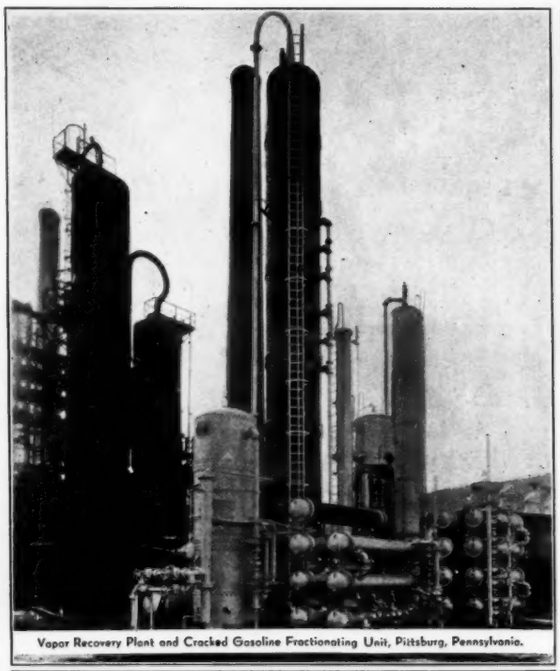
Instruments *for* Indicating Recording Controlling

JACKSON
Vapor Recovery Plants



Vapor Recovery Plant and Cracked Gasoline Fractionating Unit, Pittsburg, Pennsylvania.

ENGINEERED THROUGHOUT TO MEET THE EXISTING CONDITIONS OF VAPOR QUALITY AND THE DESIRED ECONOMIC EXTRACTION

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Complete Plant Layout
Specifications of Accessories
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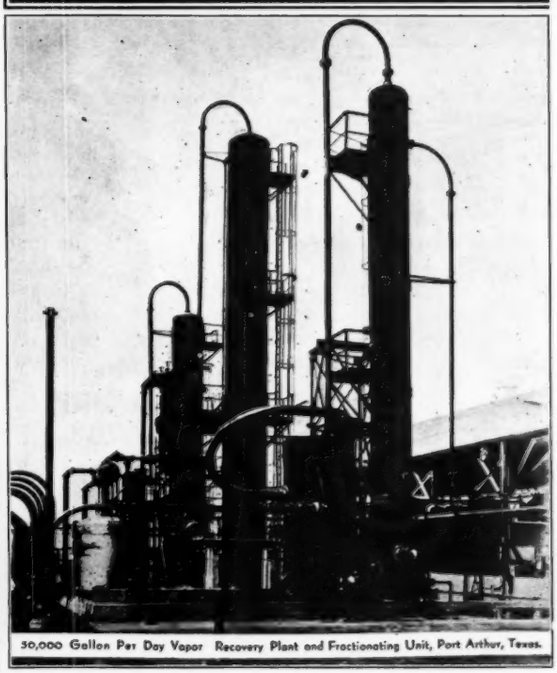
Instruction of Operators



30,000 Gallon Per Day Vapor Recovery Plant and Fractionating Unit, Port Arthur, Texas.

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